

2015

Lighting Upgrade Case Study



GILBARCO
VEEDER-ROOT



Energy Efficient Lighting Case Study – Gilbarco Auburn

Overall Site Location Details

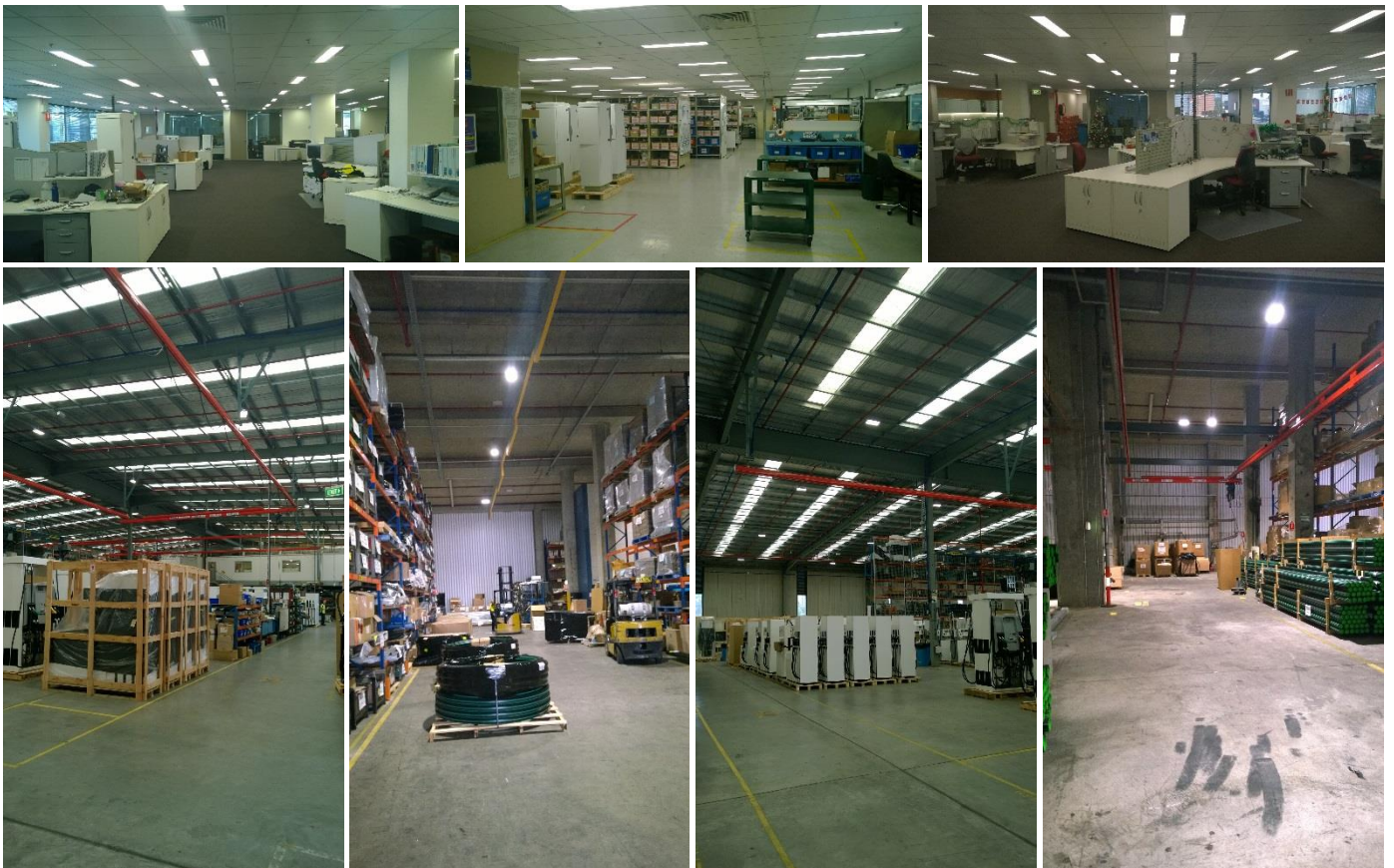
The table below highlights the key performance indicators of the energy efficient lighting upgrade and benefits of the capital investment. These figures are based on current average operational hours.

Detail	Value
Energy Consumption Reduced	254,712 kWh p/a
CO ² Emissions Reduced	266 tonnes p/a
Energy Costs Reduced	\$56,270 p/a
Project Delivery Cost	\$128,635
Upgrade ROI (Simple)	2.3 Years
Implementation Dates	13/12/2013 to 16/01/2015
Location Size	7,000m²
Product Warranty	3 Years
Service Warranty	3 Years
ESC Discount	\$16,718

Site Location Analysis

Upgrades commenced mid-December 2014 replacing the existing Twin T8 fluorescent office T-bar ceiling troffers with LED panel lighting. The lighting in other areas of the site include, factory and warehouse hi bays, fluorescent task lighting, and down lights.



Sample circuits have been logged to measure the consumption of electricity before and after upgrading, and the result are shown on Page 5.





Offices		
	Existing Lighting	Upgrade Lighting
Photo		
Lamp Type	Twin 4' T8 Fluorescent	LED Panel
Quantity	578	578
Consumption	92W/56W	32W/20W
Operational Hours	2,282 p/a	2,282 p/a
Maintenance	8,000 hrs (3.5 yrs)	30,000 hrs (13+ yrs)
Energy Cost p/a	\$35,897	\$11,846

Production & Warehouse		
	Existing Lighting	Upgrade Lighting
Photo		
Lamp Type	Metal Halide	LED High Bay
Consumption	450W	90W / 120W / 150W
Quantity	92	25 / 12 / 46
Operational Hours	2,282 p/a	2,282 p/a
Maintenance	8,000 hrs (3.5 yrs)	50,000 hrs (20+ yrs)
Energy Cost p/a	\$21,780	\$5,616

External Perimeter Lighting		
	Existing Lighting	Upgrade Lighting
Lamp Type	Metal Halide	LED Flood Light
Consumption	150W / 400W	60W / 150W
Quantity	14	14
Operational Hours	4,380 p/a	4,380 p/a
Maintenance	8,000 hrs (1.8 yrs)	50,000 hrs (11+ yrs)
Energy Cost p/a	\$1,695	\$591

Down Lights		
	Existing Lighting	Upgrade Lighting
Lamp Type	35W Halogen	LED Down Light
Consumption	35W	8.5W
Quantity	28	28
Lamp Type	CFL Down Light	LED Down Light
Photo		
Consumption	50W	10W
Quantity	28	28
Operational Hours	2,282 p/a	2,282 p/a
Maintenance	8,000 hrs (3.5 yrs)	30,000 hrs (13+ yrs)
Energy Cost p/a	\$1,670	\$348

Under Mezzanine & Fluorescent Batten Lighting		
	Existing Lighting	Upgrade Lighting
Lamp Type	Twin 4' T8 Fluorescent	Single Reflector 4' T5 Fluorescent
Photo		
Consumption	92W/56W	32W/16W
Quantity	98	98
Operational Hours	2,282 p/a	2,282 p/a
Maintenance	8,000 hrs (3.5 yrs)	20,000 hrs (10+ yrs)
Energy Cost p/a	\$5,263	\$2,214

Additional Benefits

There are additional benefits not equated as part of the evaluation on the energy efficient upgrade of lighting.

Maintenance

In addition to the costs reduced in electricity, there are savings in ongoing maintenance, service, and re-lamping from the significant increase in asset lifetime. These costs are quite high as over 50% of the lighting is mounted at heights over 4m which requires the use of elevated work platforms for safety.

Additional Energy Savings

In areas that are air conditioned, the heat from the lighting increases the load on the A/C. This cost is factored in the calculations, which equates to an additional 30% of the total lighting circuit power consumed.

Comfort

As the colour of the existing lighting was not consistent, this can result in health issues of occupying staff that regularly transition between various areas, due to subtle adjustments the eye will make between locations.

The consistent and continuous colour of the upgraded lighting will improve the ambient environment and comfort of the occupying staff. The improved lighting levels where existing lighting was below recommended lighting levels will also reduce eye strain and improve comfort. This may result in increases in productivity.

Lamps will still illuminate past their maintained lifetime and should be replaced according to the maintenance cycle determined by lamp life. This will prevent illuminance falling below desired/recommended levels.

Controls

The main factory also has daylight detection installed which yields additional savings for that area, as there is a large amount of natural light illuminating the space. This location will also be tested to verify the reductions in electricity.

*Photos were all taken with smart phone devices and unenhanced. The only modifications were resizing.

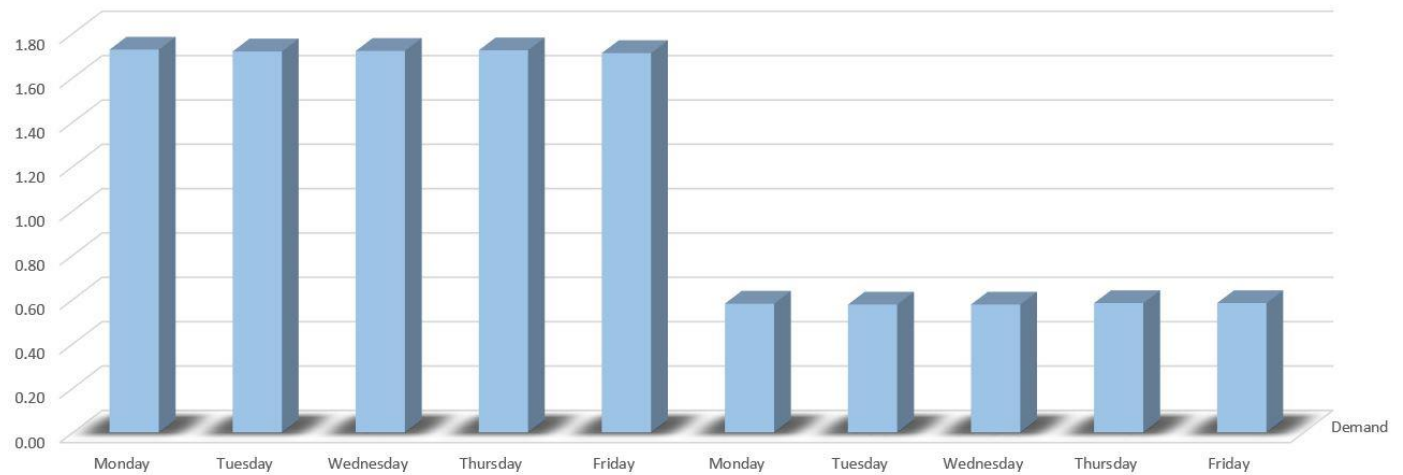
Metered Results:

Meters were installed on two sample circuits on site, in the office and warehouse.

Office:

One section metered was the office lighting, where twin T8 Fluorescent T-bar troffers were replaced with LED Panel Lighting. This is a typical scenario for Commercial office lighting and is a good indication of the typical results that can be achieved in energy reduction, and shows a 66% reduction in electricity consumption.

Office Consumption



Warehouse:

Another section of lighting metered was in the main factory. Here 400W Metal Halide, and Mercury Vapour Hi Bays were replaced with 150W LED high bays suspended at around 8m high. This section also included the addition of Daylight detection sensors.

This is a typical upgrade for industrial factory and warehouse buildings, and reflects results that can be achieved in most situations, showing a 78% reduction after the first data reading. This result will improve on average over time due to weather conditions over the time of metering.

In addition to the metered area, is a storage warehouse with varying ceiling heights, and greater reductions were achieved. In order to achieve the required lighting levels in the warehouse a range of 150W, 120W, and 90W LED high bay lights were used to replace 400W Metal Halide and Mercury Vapour high bays.

Warehouse Consumption

