

# Lighting

## Automotive Industry Energy Efficiency Project

Energy efficient lighting is a fast advancing technology being introduced on the market. The rapid improvements to achieve the desired level of lighting whilst improving efficiency have resulted in the phasing out of inefficient lamps, longer lasting lamps being developed, and reduced electricity bills.

Whilst most automotive businesses try to utilise the natural light available with skylights and translucent panels to save on electricity costs, artificial lighting is sometimes necessary to achieve the required and / or desired level of lighting.

Utilising the right type of lighting technology or lamp fitting could also potentially reduce your electricity bills. The three main types of lighting technology identified as 'commonly used' in automotive businesses include:

- fluorescent tubes
- HID high bay
- light emitting diodes (LEDs)

It is important to remember that when we consider energy efficient lighting technologies, that we compare equivalent lighting quality with reduced energy consumption. Too often lighting changes are made to 'improve' energy efficiency, but the quality of lighting is sacrificed.

It is also important to keep in mind that in order to achieve the best quality of light, you need to identify the type of lighting desired. Whether you require task lighting or general lighting, will be a key factor when considering the right lighting technology to improve your business' energy efficiency.

## Incandescent lighting

For many years incandescent lighting was a popular lighting choice, given its cheap initial cost; however this type of technology is the least energy efficient, and is quickly being phased out of the Australian market.

The affordability of incandescent lighting and its ability to turn on immediately has been a driving factor for its popularity in the market; however incandescent light bulbs have a much shorter lamp life and produce a far lower colour temperature.

An emerging detractor of incandescent light bulbs is their inefficiency. Only 10% of the energy consumed is used to produce light, with the remaining 90% of energy being released as heat.

It is highly recommended that incandescent light bulbs are replaced as soon as possible or when they fail.

## Halogen lighting

Halogen lights are a type of incandescent lamp commonly used as recessed down lights. They provide a whiter colour compared to the standard incandescent lamp, which makes them a popular choice for reception areas.

Halogen lights are known to be more efficient compared to the traditional incandescent light bulbs; however, they are still rather expensive to operate compared to other lighting technologies.

## Fluorescent lighting

Fluorescent lighting is increasingly known as the 'energy efficient' choice when it comes to lighting, and when compared to other traditional lighting technologies, it is. With the phasing out of incandescent light bulbs, fluorescent lights are fast becoming the preferred choice of lighting for many businesses.

There are two types of commonly used fluorescent light bulbs in the automotive industry:

- compact fluorescent lamps (CFLs)
- fluorescent tube and circular bulbs

## Compact fluorescent lamps

Compact fluorescent lamps (CFLs) use up to 80% less energy compared to standard incandescent light bulbs, which means lower electricity bills and reduced carbon emissions.

Most CFLs will fit fixtures that have been designed for incandescent bulbs and are generally ideal for areas where artificial lights are required for long periods of time such as an office.

Depending on the type of compact fluorescent lamp, some have a lifespan of up to 12,000 hours, which is approximately 12 times longer than incandescent lamps.

CFLs contain small amounts of mercury that could be harmful to the environment if broken. See [disposal of mercury-containing lamps](#).

## Fluorescent tube and circular bulbs

Fluorescent tubes and circular bulbs provide quality lighting and are also more energy efficient when compared to incandescent lighting. They are suitable for a number of areas including offices, reception, and workshops. High output T5 fittings are now commonly used to replace HID high bay lighting. These have the added benefit of instant start and the ability to be dimmed so they can be used to supplement natural daylight.

## Light emitting diodes

Light emitting diodes (LEDs) are the latest emerging lighting technology, and are currently considered to be one of the most energy efficient. LEDs are designed to focus light on specific locations and are ideal for down lights and spotlights used for task lighting such as an office or reception area.

Although LEDs have traditionally been designed for task lighting, LED high bays to replace traditional metal halide high bay lighting are now available from manufacturers such as

Philips. LEDs are expensive initially; however significant benefits can be gained where existing light sources are less than 400W. As with other lighting technologies LED output depreciates with time but at a slower pace than most of the other technologies resulting in a longer rated life span up to 50,000 hours. Therefore less lamp changes are required offering additional maintenance savings in addition to energy savings.

LEDs are also easily controllable with sensors or timers which offer a considerable advantage when compared to gas discharge lamps generally installed in high bay lighting that require a delay to re-strike after being switched off.

## Lighting controls

One of the easiest and smartest ways to reduce your energy consumption is to install timers or sensors on your lighting. Timers and sensors will curb your business' use of artificial lighting, and also reduce your business' use of artificial lighting. Different lighting controls will be more suitable for different areas and the type of lighting requirements.

### Timers

Timers are an affordable and convenient way to reduce wasteful energy consumption. They are a great way of controlling artificial lights in areas where occupancy is predictable.

Timers can also be matched to the business' operating hours, to ensure that lights are switched off during times when they are not required (e.g. lunch breaks) and after hours, even when the last person forgets to switch them off.

#### Timed switches

Timed switches are a great way of controlling artificial lights in spaces that are repeatedly occupied for short periods of time such as storage rooms, spare parts rooms or toilets. They will automatically switch off the light after a pre-set time.

The minimum time setting needs to be chosen carefully and should not be less than 15 minutes to maximise the lights life span.

#### Occupancy/motion sensors

Occupancy / motion sensors are one of the most beneficial and convenient lighting controls, providing security. Occupancy or motion sensors turn lights on when movement is detected and turn lights off automatically when movement is no longer detected for a set amount of time in the space. They are best utilised in areas where there is low activity such as storage rooms, meeting rooms and offices. It is important that overrides are in place in the event of an emergency. Discuss this with your electrician who will be able to program such overrides when installing the timers/timed switches.

Limiting the use of artificial lighting to only when an area is being used can save your business considerably on electricity costs. For example, an area with three twin fitting 36W T8 fluorescents controlled with motion sensors can save businesses up to \$100 per year.

### **Daylight sensors**

Daylight sensors provide a great opportunity to utilise natural daylight and save on electricity bills. They are particularly suitable for outdoor lighting used for security and marketing purposes; and could see savings of over 50%. In some cases, timers can supplement daylight sensors to switch lights off in the middle of the night. Daylight sensors installed in conjunction with a dimming system will also be able to control the amount of artificial light being used by detecting and measuring daylight entering a space and dimming or switching off lights when the required level of light is achieved with daylight.

Controlling the use of artificial lights using daylight sensors will minimise artificial light from operating during the day unnecessarily.

Where daylight sensors are installed in workshops or showrooms, it is recommended that all skylights

## **Other lighting initiatives**

### **Regularly clean skylights**

Often businesses don't notice the skylights and translucent panels available in workshops, showrooms and offices because they are dirty and not maintained often enough.

Cleaning your skylights regularly will provide plenty of natural light throughout the day, particularly in summer, minimising the need to turn on artificial light during the day.

Sometimes having clean skylights can mean turning off a few high bay lights in the workshop which could further reduce electricity costs.

### **Display signs to remind employees to turn off artificial lights when leaving a room**

This is an easy and cheap way to reduce energy consumed by artificial lighting. Displaying signs next to switches will remind employees to turn lights off when leaving an area or room. Don't underestimate the simplest of initiatives as little reminders are useful when trying to

change inefficient habits. Visit [Auto Energy Info](#) to download and print off signs you could use in your business.

### De-lamp in areas that are over lit

When replacing compact fluorescent lamps, assess the level of brightness required in the area. You may be able to de-lamp some fittings, particularly where there are triple and quadruple fittings.

It is important to note that de-lamping should not affect the comfort of the working environment and there are Australian Standards on the level of brightness to consider.

Below are examples of savings automotive businesses achieved after making some energy efficient choices with their lighting.

Energy saving opportunity	Savings (kWh)	Savings (\$)	Payback period
Replace 54x 400W high bay lights with LED, T5 or induction high bay lighting	31, 603	\$4840*	3—7 years
Replace 8 x 400W high bay lights with LED, T5 or induction high bay lighting	5, 370	\$1280*	2.5 years
Replace 7 x 400W floodlights with Induction, LED or CFL lights	2, 420	\$810*	2.5—5.5 years
Install occupancy sensors in a large meeting room	500	\$80*	3.2 years
Install occupancy sensors in spare parts area	300	\$90	2.2 years
Replace 58W and 36W T8 fluorescent tubes with LED lighting in commercial fridges and freezers	22, 270	\$5570*	1.9 years

\*Calculated savings (\$) may vary depending on the business' electricity rates