

# Street illumination's **BIG SWITCH**

Once a niche alternative for lighting streets, public spaces and buildings, LED technology is fast becoming a mainstream choice for councils across Australia.

**Paul Hemsley** reports on the key considerations in replacing infrastructure.

**H**ow many councils does it take to change a light bulb? The answer was 41 when the New South Wales government and energy authority Ausgrid revealed an ambitious plan in August 2013 to replace existing mercury vapour street lights with light-emitting diode (LED) technology.

The big change was the largest overhaul of its kind in Australia when Premier Barry O'Farrell's government announced its plan to change to LED street lights across Sydney, the Central Coast and the Hunter. As LED is a relatively newer and far more energy efficient technology, governments across Australia have been keen to switch to LED because of the potential savings in maintenance and energy costs it offers.

While the anticipated savings have varied between governments, the expected results make the switch an easy decision for cash-strapped councils looking to hold on to every last cent.

The local government push for sustainability hasn't been hampered by the election of the Abbott government in September 2013 as the new federal Minister for Environment moved to slash a line of Labor government green schemes.

But now sustainability is a core business in local government, as councils have already invested in new environmentally friendly infrastructure such as LED street lights, cycle ways, electric vehicles and trigeneration.

Street lighting is an essential public service because it necessarily



makes streets safer and more visible in the black of the night.

A standard feature of every area where people live or converge in the developed world, the adequate illumination of roads, streets and footpaths makes the outside world as accessible in the night as it is in the day.

It may be taken for granted, but lighting remains an essential piece of public infrastructure that governments and energy authorities provide both for public safety and to focus attention on signs or hazards that would otherwise be perilously hard to see.

But as night falls, and thousands of street lights are activated in one municipality alone, the electricity meter starts to create a lasting impact on the pockets of councils and rate payers. It is, quite literally, the price of keeping the lights on and has not come cheap, especially when wholesale electricity costs climb with the thermometer.

Electricity and carbon costs remain a big challenge for local governments in Australia, especially those actively working to create sustainable cities. Subsequently, the ruler is being run over both the environmental and financial impacts of existing technology used by power utilities.

Street lights, which have traditionally used mercury vapour bulbs to produce a distinctive orange-yellow glow, are a high profile target as users pursue alternatives that can result in lower electricity costs, bigger savings and energy efficiency.

Even though councils have had a wide variety of lighting forms to choose from, LED has emerged as the favourite – as demonstrated by its most recent mass adoption by the NSW government and the City of Sydney.

It's a low-energy light source that has been used as indicator lighting in practical electrical components since the 1960s and has become a popular backlight for liquid crystal display (LCD) televisions and computer monitors since the mid-2000s.

They are a semi-conductor which emits light when an electric current passes through it. They don't have a filament like traditional light bulbs, so they don't get hot, require far less electricity and last much longer.

But the applications of LED have been broadened as governments have become attracted to its energy efficient properties.

However, all new technologies need to be tested, broken in and proven. As LED is only in the infancy of its fitting in street lights in urban areas, potential teething problems need to be identified and fixed.

To ensure that new LED lights were suitable, the NSW Department of Energy conducted an 18 month trial of 62 LED street lights in eight locations across Sydney and the Central Coast. The government was motivated to move further with its LED street lighting plan as the trial revealed electricity use was reduced by up to 70 per cent – depending on the type of light that was being replaced.

The trial's results also indicated that short term maintenance was minimal and that residents preferred the light output of the LEDs.

## SYDNEY PUT UP IN LIGHTS

The cost savings and benefits to public amenities of LED have been pushed hard by the City of Sydney, which began its own implementation of LED street lighting before the NSW government announced its plan in 2013.

The City of Sydney launched its new LED street lighting initiative in March 2012, when it announced that it had entered into a joint venture with General Electric (GE) and UGL Limited to replace 6,450 conventional lights in a three year project worth \$7 million.

It was a major project for a City that is one of the largest users of street lighting in NSW, with even more conventional lights left over numbering at 22,000 in the city's parks and streets. The responsibility of 8,500 of these lights lies with the City, while Ausgrid maintains the remaining 13,500.

The savings are significant. City of Sydney Lord Mayor Clover Moore said that the lighting will reduce emissions, halve the energy use and save about \$800,000 a year in electricity bills and maintenance costs.

According to the City of Sydney, the LED lights will cut emissions equivalent to 2,861 tonnes – or taking 940 cars off the road. The council also stated that LED lights use 40 per cent less electricity and cut the City's carbon output by 40 per cent.

The City's plan to implement a more cost-effective lighting system hadn't paid off as much as it had anticipated in early 2012, but it enthusiastically announced in mid-2013 that it had saved \$295,102 in public domain lighting costs and \$33,540 in maintenance fees.

But the benefit to public amenity was a big win for the City, which conducted a survey after its 18 month trial of LEDs, which revealed that more than 90 per cent of people found the new lighting "appealing" and three quarters said it improved visibility.

## ISSUES PUT UNDER THE SPOTLIGHT

As the NSW government and the City of Sydney move on their widespread replacement of traditional street lights with positive results after the trialling period, for government buyers and project managers a few issues remain at the fore.

Although the City of Sydney insists that all luminaires must comply with Australian standards for brightness, materials, glare requirements and colour, where a given product ultimately comes from or is produced is still an issue for governments to look out for.

The supplier of the LED lights in the NSW government and Ausgrid's project is Sydney-based company Sylvania. The company has produced a list of tips for governments of what they should look out for when shopping around for new street lights.

Sylvania's manager of business development Tony Lambrechtsen says the key is to look for a brand name that's been around for decades.

"That way you know that they're going to make sure that whatever they sell is going to last for decades," Mr Lambrechtsen says.

Mr Lambrechtsen points to the technical characteristics of some LED lights that could concern buyers, such as a high level of heat output.

"You've got to make sure that the product that's designed around the LEDs is capable of dissipating that heat so there's good quality heat syncs," he says.

The distances between the light poles is also a potential issue because it is wider in Australia than in most European and North American countries.

"The drawback is if you don't get something that's designed in Australia, then you're going to try to find something that's made in Europe or America that doesn't fit our assets – it won't have the same light distribution," Mr Lambrechtsen says.

According to Mr Lambrechtsen, another difficulty for project managers is figuring out if an LED fitting meets the standards of the lighting pole.

He says there are certain poles that should only take seven kilograms but the weight variations of LED lights means that they can weigh up to 15 kilograms. If lights of this weight are installed, the pole outreach could sag.

This sagging outreach could result in the light going "everywhere except where it is meant to go".

"Make sure it's great performance and it meets the distribution that you want to get," Mr Lambrechtsen says.

"If they've just picked a product and say that looks nice and replace it with that product, it puts all the light down and you may get patches where there's no light because it doesn't have that side throw characteristic."

He says councils aren't going to have any issues with lighting distribution if they look for a certified design that ensures light levels are being achieved as per Australian standard. **GN**