Energy saving at the QVMAG

The light fantastic – QVMAG saves big bucks with clever lighting

The Queen Victoria Museum and Art Gallery (QVMAG) in Launceston has over 1000 fluorescent lights, many of which are turned on all day, every day – at a cost of around $16,000 each year to Launceston City Council. Our project aimed to find the most energy efficient way to light the building while keeping the lit spaces safe and comfortable.

This project is part of Council’s aim to reduce greenhouse gas emissions from 2007–08 levels by 15 per cent by 2015.

What’s the best way to light a large building?

We did a tour of other large buildings like QVMAG to get a handle on what works best when it comes to lighting. We engaged some lighting consultants and were fortunate to engage a creative electrician who was keen to help with modelling and experiments.

There were quite a few options, particularly when it came to the type of lights for the job; lighting technology is evolving quickly and there are lots of energy efficient options out there. But wattage isn’t the only thing to consider when it comes to lighting a large space: shadows, light colour and quality all have an effect on personal comfort and wellbeing.

The options

Initially we tested our ideas in one room, which allowed us to evaluate each of the options in a real-world setting without spending too much time or money. In the end we found two options that suited us: de-lamping, and using T5 lamps.

De-lamping

Each of the fluorescent fittings at QVM has two 36W tubes (72W total). De-lamping simply involves removing both fluorescent tubes and replacing them with a single 36W quad-phosphor tube (which is brighter than the standard tubes), at the same time adding a reflector to boost the effect of the single tube. We found there is still enough light thrown out; most offices were over-lit anyway at a level of 500 to 600 lux (the Australian standard requires a minimum lighting level of 320 lux for office spaces).

Energy consumption halved

Effectively, energy consumption halved while light levels fell by only 20 per cent. This was a simple option that cost around $28 per light ($20 for the reflector and $8 for the quad-phosphor tube). Installation is quick and easy: remove the old tubes, install the reflector with self tapping screws and then put in the quad-phosphor tube.

Better light quality

We interviewed users of workrooms where we’d tried de-lamping; they didn’t notice the drop in light levels – in fact many people thought their room was brighter because the quad-phosphor lamps produce a better quality of light.

Using T5 lamps

The other option we tried was to replace the old fluorescent tubes with T5 lamps. These are fluorescent lamps that are five-eighths of an inch in diameter (hence ‘5’). The lights operate at 22W, use about 50 per cent of the power of old-style fluorescents and last up to three times longer.
No more flickering
Another feature of T5s is that they have their own electronic ballast at each end, which means they start instantly without flickering. This meant that we could hook them up to movement sensors so that lights only come on when someone walks into the room.

Installation simply involves removing the old tube and starter then inserting the new T5 fixture straight into the light fittings.

Slightly more expensive, but better light and great savings
The conversion kits cost around $22 each ($44 for a standard light fitting with two tubes). While it’s slightly more expensive initially to replace both fluorescent tubes with T5s, these lamps reflect light around the room very effectively, giving a light quality that’s as good or better than before. Their lower energy consumption and better life expectancy, combined with their suitability for use with movement sensors, add up to a very high potential energy saving.

And the winner is ...
In the end we chose the T5 tube option for QVMAG. Although the cost of purchase will be around $20,000, our annual saving will be $8000; the program will pay for itself in two-and-a-half years and then give us ongoing savings.

Advice for someone planning a similar project
Try things on a small scale to make sure you can accurately measure the effect of your changes. Don’t just measure lux levels directly beneath a light, but consider the quality of lighting throughout the whole room. Check out shadows in corners and on the ceiling, and after several days ask the people who use the room if they feel comfortable with the new lighting.

Also check all the fittings in your building to check that the new lights fit before making a bulk order. Ask your local electrician to check to make sure there are no risks in installing the new ones.

What’s next?
We found these results extremely encouraging, so the next step will be to change the remaining fluorescent lights at QVMAG to T5s.

Next we’ll look at lighting in the buildings at Aurora Stadium, and in other council buildings such as the Town Hall. This project has shown us that with a little effort we can make a huge dent in our carbon emissions.