CASE STUDY 03/01

Industrial scale

energy saving lamps expand lighting options

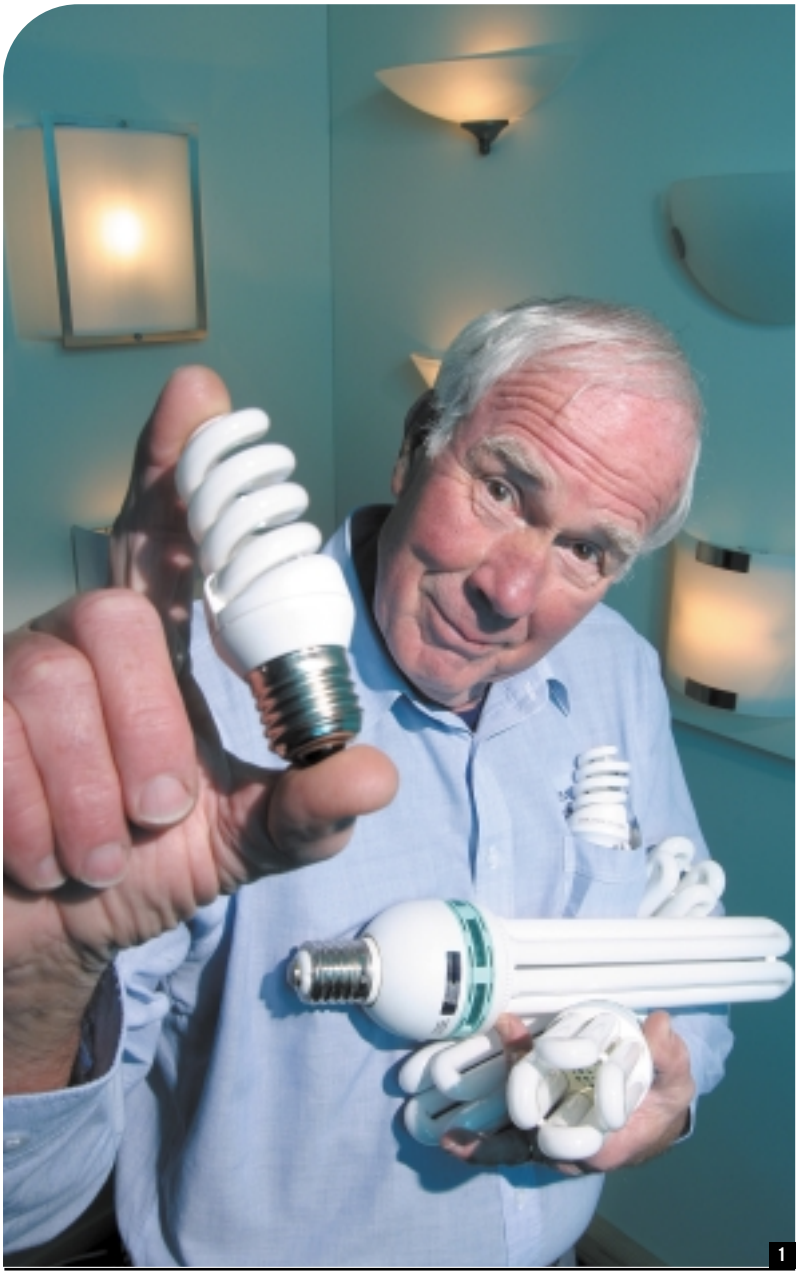


Photo: Marcel Tromp

Compact fluorescent lamps in sizes up to 180 watts can replace mercury vapour and metal halide lamps up to 400 watts – using less power, producing less heat and switching on instantly.

1 EMIL WITSENBURG DISPLAYS A SELECTION OF CFL LAMPS FROM HIS AUCKLAND COMPANY XTRA LIGHT.
THIS CASE STUDY LOOKS AT FOUR EXAMPLES OF AUCKLAND COMPANIES THAT HAVE INSTALLED THE LAMPS.

Emprove is a service provided by the Energy Efficiency and Conservation Authority (EECA). To find out how your business can save energy, visit www.emprove.org.nz or ring 0800 358 676

emprove
energy management is **smart** business

2 ETA'S PACKING ROOM, WHICH HAS A MIXTURE OF **COMPACT FLUORESCENTS AND METAL HALIDES**. THE METAL HALIDES HAVE A WHITER LIGHT THAN THE COMPACT FLUORESCENTS AND HAVE CONTROL GEAR ON TOP OF THE FITTING.

Griffin's

Griffin's Foods Ltd's Eta factory in Wiri, south Auckland, installed around 60 Xtra Light lamps on the recommendation of energy auditor Rodger Kallu, of Aquacare Ltd.

Griffin's replaced existing 400 W metal halide lamps and ballasts with 120 W compact fluorescents and electronic ballasts, keeping the original shades.

Says Griffin's Wiri operations manager Zane Bailey: "I'd basically never heard of them before he recommended them. They're untried and unproven [in New Zealand], and we were a little bit sceptical, but we've done tests and will check the lighting levels periodically."

Kallu conducted a thorough energy audit of Griffin's Eta snack foods factory as the first stage of audits of its other two facilities, biscuit factories in Papakura and Lower Hutt.

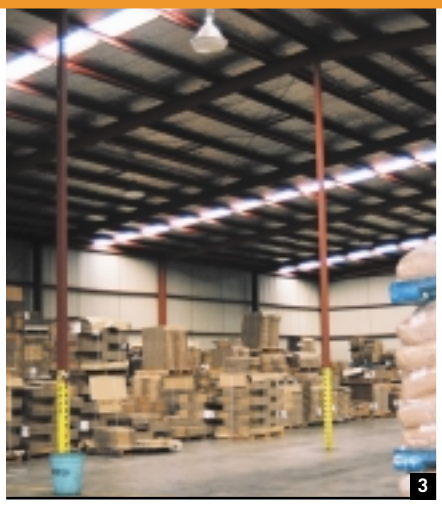
Bailey says the 120 W lamps have been a great success in several warehouses and the main factories where potato chips, corn chips, nuts and other snack foods are made and packed. The factory processes up to 80 tonnes of potatoes a day.

The lamps have been installed in high bay fittings as an alternative to 400 W metal halides. Says Bailey: "The light output's nowhere near as much as the metal halides but it is adequate for what we use them for. Where we knew the light levels wouldn't be adequate with the [CFL] lamps alone, we've got a mix. The reflective surfaces in the warehouses are pretty poor, and the minimum lighting is down to 60-odd lux. But it's adequate." The light fittings are quite widely spaced.

Eta has 52 lamps in the warehouses, and others have been installed as a mixture in the factory, combined with the original metal halides. In the warehouses they have been fitted with daylight sensors so when enough light is coming in through roof skylights, they switch off. Originally there was a problem because they would switch on at night, when nobody was using the warehouses, but this has been remedied with timers.

Bailey says one of the main benefits is that when they switch on they light up straight away, instead of taking several minutes like metal halides. Although they do not come to full strength for a minute or two, and there is an initial flicker, they illuminate immediately, which is useful when a forklift zooms through the rollerdoors to pick up cartons. The inward goods store has the lights switched on all day because adequate lighting is needed for reading labels.

During the assessment period, Bailey measured the actual electricity consumption of the metal halides and found that instead of the rated 400 W they were actually drawing more than 1000 W when they first came on, "and even when they backed off they drew 600W." This caused a power demand surge. Says Bailey: "Even with a blown fitting they used 80 W in the starting gear and control gear."



3 ETA'S CARTON STORE, WHERE ALL THE LIGHTS HAVE AUTOMATICALLY SWITCHED OFF BECAUSE DAYLIGHT LEVELS ARE ADEQUATE. COMPACT FLUORESCENTS HAVE BEEN INSTALLED IN ALL ETA'S WAREHOUSES.

Bailey estimates that the compact fluorescents already installed will pay for themselves in just over a year. He says the compact fluorescents are good for replacing mercury vapour lamps, because their light output is similar, but metal halides have a better light output.

The lighting upgrade is part of a major energy efficiency boost at Griffin's, which is taking advantage of EECA's Energy Audit Grants Scheme to get a rebate on the cost of the audits. Bailey says more money has recently been freed up for energy efficiency investments such as improving the power factor.

Range and options

Sizes range from 7 W to 45 W for the domestic models, and 65 W to 180 W for commercial lamps. They are available with various bases and several colour temperatures, from warm white at 2700K to 5000K and 6400K.

A 65 W CFL replaces conventional lamps up to 250 W and the 85 W or 125 W replaces lamps up to 400 W. For larger lamps with control gear, a conversion kit replaces the old ballast and lamp and retrofits the new electronic ballast into the existing hole in the top of the old shade.

4 XTRA LIGHT'S RANGE OF **COMMERCIAL** (LEFT) AND **DOMESTIC-SCALE** (RIGHT) COMPACT FLUORESCENTS. THE LAMPS WITH SEPARATE BALLASTS ARE CHEAPER TO REPLACE, BECAUSE THE BALLAST OUTLIVES THE LAMPS. COSTS IN 2003 RANGE FROM $12 FOR THE SPIRAL 9 W LAMP TO $120 FOR THE 120 W LAMP AND BALLAST.

Centra Auckland Airport Hotel

Central Auckland Airport Hotel chief engineer Kelvin Ready is installing Xtra Light CFL lamps in the Centra's 250 rooms at the rate of 40 a month.

He has a 15 W lamp in the globe-shaped fitting in the entry lobby of each room, four more in wall uplighters, and two 26 W CFLs in the bedside lamps that have large conical shades. After trialling various Xtra Light lamps, Ready and Witsenburg settled on particular types to install as standard.

Ready found the lamps had an unexpected bonus. After the bed height was elevated to make it easier for the housemaids to change the linen, the bedside lamps became relatively low, and the light did not spill sufficiently for the guests to read in bed.

They tried to redirect the light by wrenching the lampshades to an angle, and the damage was becoming expensive.

Ready says the new, brighter CFLs shed light further across the bed, and this has remedied the problem.

The lights also emit less heat, which means brighter lamps can be installed in a fitting which is rated for lamps no higher than 60 W. Output from the 15 W compact fluorescents is equivalent to 75 W incandescents. The 26 W bedside lamps are equivalent to 120 W incandescents.

Ready says because of its location near Auckland Airport, the hotel faces particular challenges.

5 FITTINGS IN THE **CENTRAL CONCOURSE** NOW HOUSE **COMPACT FLUORESCENTS INSTEAD OF SPOTLIGHTS** AND INCREASE THE LIGHT OUTPUT.

The guests are usually there for only short stays, averaging a day and a half, and often leave very early in the morning to catch flights or start work. "They leave everything going, the lights, air conditioning, everything." He has strategies for switching off, but the less energy the lights consume while they are switched on unnecessarily, the better.

Xtra Light lamps have also been installed to replace R080 spotlights in a circulation area near the dining room, and where conference groups break out for morning and afternoon teas and buffet lunches.

Says Ready: "We had 75 watt spotlights on 24 hours a day in there. Now we've got 100 watt-equivalent [25 W reflector] compact fluorescents. In the lobby where we had two 60 W lamps we've gone to one fluoro.

That's saving $160 a month for the two areas."

Previously, Ready was replacing 10 or 12 lamps each 10 days or so.

6 REPLACING **75 W INCANDESCENTS** WITH **26 W COMPACT FLUORESCENTS** IN THE **CENTRA AUCKLAND AIRPORT HOTEL'S BEDSIDE LAMPS** HAS IMPROVED OUTPUT.

"[CFLs] have taken the heat out of the fittings and the air conditioning." – Kelvin Ready.

Premier Plastics

Morris Watson, managing director of Premier Plastics in Morningside, Auckland, and Emil Witsenburg tried out several CFL types for Premier's new assembly area and chose 120 W CFL lamps and ballasts installed in high-bay fittings. "I had been intending to use mercury vapour, but thought the compact fluoros were worth a look," says Watson, who is pleased with the lamps' performance and cost-effectiveness.

The lamps are switched on 24 hours a day, five days a week. Premier will spend $2400 less on a year's electricity by choosing the CFLs, giving a payback period of seven months.


7

7 **PREMIER PLASTICS**' WORK AREA HAS SIX COMPACT FLUORESCENTS IN THE HEMISPHERICAL HIGH-BAY FITTINGS. A **SEPARATE SWITCH** FOR THE LAMP NEAREST THE FRONT ROLLER-DOOR ENABLES IT TO BE **SWITCHED OFF** WHEN IT IS **NOT NEEDED**.

Adept Limited

Adept Limited is a high-tech, quality-conscious team of designers, toolmakers and moulding technicians, which makes complex industrial plastic components.

Its bright new warehouse in Morningside, Auckland, combines daylighting from skylights in the roof with large CFLs in high-bay fittings. The CFLs are also installed in the adjacent tooling area, where fluorescent tubes add extra light above workstations.

General manager Murray Forbes and maintenance manager Walter Michie chose 22 specially designed luminaires with a list price of $399 each. Each has two 120 W CFLs and separate ballasts. The fitting can be wired so one lamp can be remotely switched off when less light is needed.

The energy saving compared to the standard choice of mercury vapour lamps or metal halide and control gear was around 200 W per lamp. During the 30,000 hour life of the ballasts, the two-lamp fittings will require four lamp replacements at $30 each.

Adept is also trying out CFLs in the injection moulding area, where they will gradually replace metal halides that reach the end of their lives.

Lighting levels are 230 lux on the top shelf in the warehouse and 130 lux at one metre above the ground. The lamps hang seven metres above the floor, 1.8 metres higher than the top shelf and 1.8 metres to the side of the lamp.

In the tooling area, with lamps six metres above ground and five metres apart, readings are 200 lux beneath each lamp and 180 lux at the centres between them. The dual fitting produces 550 lux at four metres and 700 lux at three metres.


8


9

8 **ENERGY-EFFICIENT LARGE COMPACT FLUORESCENTS** WERE USED INSTEAD OF MERCURY VAPOUR LAMPS IN SPECIALLY **DESIGNED TWO-LAMP FITTINGS** AT **ADEPT LIMITED'S** WAREHOUSE (ABOVE) AND TOOLING AREA (RIGHT).

9 **SKYLIGHTS** IN THE 8 METRE HIGH CEILING **PROVIDE NATURAL LIGHT**, WHILE **LOW-SLUNG STANDARD FLUORESCENT TUBES** PROVIDE HIGHER LUX LEVELS FOR **DETAILED WORK AT THE WORKBENCH**.

CONTACT Xtra Light Ltd, 0800 4 FLURO (0800 435 876), 025 525 265, xtralight@xtra.co.nz, www.bltlighting.co.nz

Lamp choice

Energy-saving 120 W compact fluorescent lamps are suitable for providing general lighting in situations where 400 W metal halide or mercury vapour lamps would otherwise be used, say in high-bay fittings.

They light up quickly compared to metal halides, so suit situations such as warehouses where they are left switched off as a default, and activated by a sensor switch or manually when required. They also suit situations where they automatically switch off when daylight levels are adequate.

They emit little heat and are long-lasting, maintaining lighting levels towards the end of their lives. They provide less light than the equivalent metal halides, so supplementary lighting should be provided for close work. In situations where ceilings are lower, new generation triphosphor T8 fluorescent tubes with efficient reflectors provide better levels of illumination per watt.