

## **WA Police Service case study**

**Energy efficiency does not always require excessive capital outlay or a high investment of time and resources. The Western Australian Police Service has made remarkable energy savings using limited capital investment and a little innovation. A project which included, a lighting retrofit program, a modification of the air conditioners in the computer room and replacement of an obsolete cooling tower has resulted in high returns over the short term.**

### **Introduction**

The Police Headquarters, the Central Lock-up and the Central Police Station are all housed at the Police Headquarters site located on Adelaide Terrace. In recent years there has been deliberation on the anticipated life of these buildings particularly in light of the new Police Service Buildings planned at Midland and Joondalup. Given the uncertainties surrounding the longevity of the Adelaide Terrace site for Western Australian Police Service use, energy saving initiatives have been difficult to contemplate. In order to be viable, any remedial work would have to incur minimal capital investment and result in a short term payback period. Despite these difficulties various energy reduction initiatives have been successfully implemented and these have proven extremely cost effective.

### **Improving the energy efficiency of the facility**

The project focused on three energy saving measures:

- Upgrading the existing light fittings
- Modifying the computer room air conditioning plant operation
- Replacing the existing cooling tower

### **Light fitting upgrade**

Upgrading the existing light fittings at the Police Headquarters site was a low cost and easily implemented endeavour. Investment in remedial works was \$22 720. The work included re-tubing and repairing 2620 light fittings and replacing the fluorescent lamps with half the number of tri-phosphor tubes. The existing diffusers on light fittings were reused and reflectors on fittings remained unchanged. The saving in energy consumption and costs from this simple initiative has been phenomenal. It is estimated that over a one year period the lighting upgrade program will achieve a 16% reduction in energy consumption and will result in cost savings of over \$64 000, equating to a payback period of only 4.2 months. In addition, this figure does not include the further savings obtained from the reduced heating load on the air conditioning plant or the decrease in maintenance charges. There is a significant reduction in the need to replace tubes and service lighting due to the longevity of the tri-phosphor tubes. Standard 36 watt tri-phosphor lamps have a life expectancy of 20 000 hours compared to the 8 000 hours available from traditional halo-phosphor lamps.

There are also considerable environmental benefits associated with the use of tri-phosphor tubes. For example, traditional halo-phosphor lamps require more mercury in production than tri-phosphor technology. Mercury is highly toxic and the disposal of fluorescent lamps can pose a serious threat to the environment. Also, in the current case study it was determined that the energy savings from the tri-phosphor tubes would release 751 tonnes less CO<sub>2</sub> into the atmosphere when compared to the CO<sub>2</sub> levels released by the previous fluorescent system.

### **Updating the computer room air conditioning plant**

The WA Police Service were able to make a substantial energy saving by reassessing and improving the air conditioning operation levels in the computer room. The project involved no capital outlay and the only 'cost' was the time spent reviewing the actual heat load generated by the computer room equipment. In the previous eighteen months some equipment had been relocated and there had been replacement of older machines with newer models boasting lower heat output. As a result of the review and based on an evaluation of current and future heat load estimates, it was found that the heating load was significantly reduced. This resulted in the switching off of three of the five air conditioners. Also, settings on all five air conditioning units were altered to the same set points and the room temperature was set up by 1.0°C to 22.0°C. In addition, the re-setting of the high temperature set point for the standby air conditioning unit to a higher value, prevented this unit from operating when not required. It is expected that in its first year of implementation, this system will save more than \$31 000, equivalent to a 6.3% reduction in energy consumption.

### **Replacement of the cooling tower**

The replacement of an obsolete cooling tower, well past its prime, is also expected to provide energy savings to the Western Australian Police Service. Although not in itself a specific energy saving measure, replacing the original cooling tower with a more efficient model will precipitate various energy efficient knock-on effects. Replacement has resulted in water being supplied to the chillers at the optimal temperatures needed to reduce the number of chiller start-ups. In addition, the new cooling tower has ensured that chillers operate at optimal levels and has reduced the operating times of the cooling tower fans and chilled water pumps. These factors are expected to substantially contribute to a reduction in energy consumption.

### **Summary**

The above measures undertaken by the Western Australian Police Service have demonstrated possibilities available to those organisations requiring short term returns at minimal capital input. In addition, this case study highlights the remarkable energy savings which can be achieved when businesses are aware of their changing needs and adapt accordingly.