



SHERATON PERTH

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Introduction

A hotels energy use benchmarking project, a partnership between the Commonwealth's Energy Efficiency Best Practice (EEBP) program and the Australian Hotels Association, has shown how hotels can maximise profits, minimise energy costs and demonstrate leadership by reducing energy use and greenhouse gas emissions—without negatively impacting on the comfort or satisfaction of their guests and customers.

During the project, energy use data was collected from around 50 hotels across Australia and then six of the better performing hotels were examined in depth. The results of the benchmarking exercise have been well documented in a report and series of case studies. This case study is on the Sheraton Perth in Western Australia.

Sheraton Perth

The Sheraton Perth is a 388-room hotel with a total floor area of 43 000m². The hotel has 14 floors of accommodation and 8 000 square metres, over four floors, of commercial office space. Hotel guests enjoy Perth's Mediterranean-style climate, which is marked by dry summers and a moderate rainfall. The building's east/west orientation provides guests with a choice of ocean or interior views.

Sheraton Perth management is committed to conservation, having implemented an Environmental Management Policy to reduce and monitor resource use across the hotel and commercial sublet offices. The policy's key element is an annual target for greenhouse gas emission reductions. A target of 200 tonnes was set for 2000. This was exceeded with a single initiative—replacing existing ice makers with efficient ones, which saved 223 tonnes of greenhouse gases alone.

One of the policy's aims is to gain the support of guests. Hotel guides in each room urge guests to turn off air-conditioning and appliances when they leave their room. Guests are advised to open their windows during winter when the air-conditioning is off.

Assistant Chief Engineer, Tony Fioraso, says: 'Guests staying between April and September soon realise we mean what we say. We turn the air-conditioning off during daylight in winter—since Perth has a mild climate, it's not necessary. The few guests who query it are given a demonstration of how the cross ventilation works. Many get a shock, as they have never come across a high rise with windows that open.'





Preventative maintenance is another feature of the hotel’s Environmental Management Policy. Tony says: ‘Maintenance is the important aspect in resource efficiency. I can count on my fingers the number of after-hours’ breakdown callouts we’ve had in the past two years since we started our maintenance program. Equipment operates better if it’s well maintained. The other important thing is building controls. We’ve found a lot of wastage through incorrect control settings and parameters, drifting analogue and basic on/off controls.’

Key energy efficiency investments and savings

Item	Capital cost	kWh energy savings p.a.	Energy cost savings p.a.
VSD control of primary chilled water flow	\$8 500	233 280	\$23 328
Electronic chilled water control valves	\$20 100	89 107	\$8 911
Efficient 75 Watt decostar lights (replacing 150 Watt paraflod)	\$6 000	87 600	\$8 760
Electronic thermal expansion valves on low load chiller	\$7 500	109 500	\$10 950
Temperature setback on pool heaters	\$1 500	30 000	\$2 484
New control system on hot water system	\$2 500	194 807	\$16 130
Efficient ice makers	\$6 000	230 400	\$23 040
Compact fluorescents in corridors	\$16 800	120 187	\$12 019
Flow restrictors on guest rooms showers	\$16 112	58 333	\$4 830
Total	\$85 012	1 153 214	\$110 451

Management system initiatives

- ▶ Staff involvement through an Environmental Committee.
- ▶ Development of an environmental policy, including the establishment of greenhouse reduction targets and guest awareness programs.
- ▶ Operational and maintenance budgets used to implement energy saving initiatives.
- ▶ Cost benefit analysis reporting undertaken on proposed energy saving initiatives.
- ▶ Major investments made at time of refurbishment or upgrade of infrastructure.
- ▶ Regular meetings with housekeeping and kitchen staff to maintain energy management awareness.
- ▶ Participation in EEBP’s hotels energy use benchmarking project, and also the Australian Greenhouse Office’s Greenhouse Challenge Program.

Key outcomes of energy efficiency investment

Capital investment: \$85 012

Energy savings: 1 153 214 kWh p.a.

Energy operational savings: \$110 451 p.a.

Greenhouse Gas savings: 1 176 tonnes CO₂ p.a.

Return on capital invested inefficiency using energy savings: 130%

Net Present Value: \$593 664 (discount rate 10%, life 10 years)

Energy benchmarks: 860 MJ per square metre

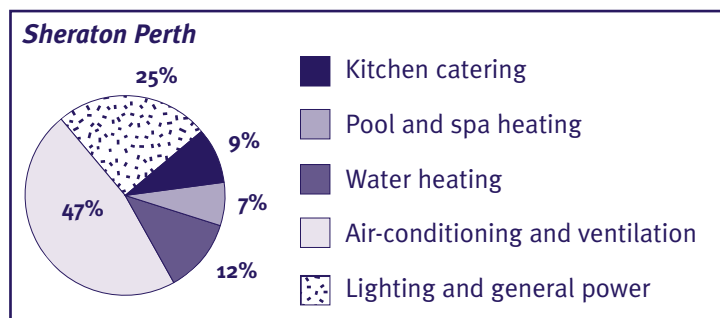
Energy use—industry average for a business hotel: 1 000 to 1 100 MJ per square metre

Energy planning goals for 2001

1. Replace pneumatic control valves with electronic for pool heating and air-conditioning controls.
2. Evaluate replacing incandescent lights in standard lamps with compact fluorescent lamps in guest rooms.
3. Evaluate installing four-pipe water system for guest room climate control.
4. Replace existing shell and tube heat exchanger on air-conditioner with more efficient plate-heat exchanger.
5. Install meters to monitor air-conditioning.
6. Refine programming of air-conditioning controls in banquet and hotel common areas.
7. Install metering in Sheraton Court Offices to allow hotel energy performance to be reported without the 8 000m² office space.

Key energy use areas

Total annual energy use for the year 2000, excluding commercial offices, was 36 966 001 MJ. A breakdown of usage into key service areas indicates that air-conditioning and water heating are the hotel's primary energy drivers.



Energy use in service areas by percentage

Key efficiency initiatives

Initiatives incorporated during building construction

1. Economiser cycle provided to all rooms.
2. Operable windows installed in guest rooms.
3. Fluorescent lamps installed in bathroom vanity units.
4. Gas used for water heating, pool heating and space heating.
5. Fluorescent fittings installed in reception, shop, offices, conference room, kitchen, workshops, stores and laundry.

Lighting initiatives since construction

1. Three hundred and sixty dual 40 Watt fluorescent lamps replaced by dual 36 Watt fluorescent lamps at back of house.
2. Compact fluorescent lights installed in guest bathrooms and hotel corridors.
3. Two hundred 150 Watt PAR 38 lamps replaced with 75 Watt Decopar lamps in conference rooms.

Building Management System controls

1. Variable speed drives installed on main chiller plant's primary water circuit to control water flow to 53 litres per second (previously 63 litres).
2. Electronic TX valves installed on low load chiller, saving an estimated 120 000 kWh per year.

Efficient appliances

Six ice makers replaced with two larger capacity, more resource efficient models. The poor design of the old machines wasted more than 300 kl of water annually.

Water heating

Two major initiatives have been implemented to reduce hot water energy losses:

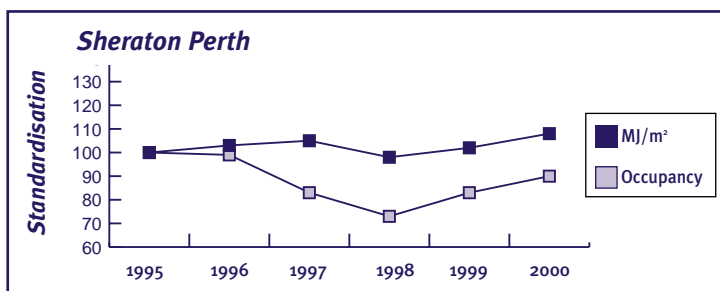
1. In 1997, a new control system was installed for the hotel's two 600 hp gas boilers, which established a lead-lag control strategy and the lowering of hot water temperature from 80°C to 65°C. This initiative cost \$2 500 and saves more than \$16 000 per year.
2. In 1999, each of the 388 guest room tap seats were fitted with flow restrictors at a capital cost of \$16 112. The flow restrictors reduced the flow rate from 30 litres to 12 litres per minute, saving an estimated \$4 200 in natural gas and 5.4 ML in water annually.

Pool heating

The 45 000-litre heated pool is heated year round and controlled through the use of time functions on the BMS. Temperature setbacks were applied to the pool, allowing temperature drift in early morning. These measures save an estimated 30 000 kWh annually.

Overall hotel performance

The energy performance of the Sheraton Perth over the past five years is charted below.



More information

The hotel's energy use benchmarking project concluded that best practice hotels always have systems in place to regularly monitor, record, analyse and report on hot water, gas and electricity use. They often have full time engineers on site and continually seek ways to optimise energy performance. Best practice hotels also understand the importance of incorporating efficiencies into day-to-day operations and into the planning of renovations and retrofits.

EEBP supports industry sectors to identify and implement cost-effective solutions for a more sustainable and competitive future. The program has a combined focus on innovation, training and benchmarking and offers practical tools, information and assistance. EEBP is working with a growing list of industry sectors, which includes aluminium production, beverage and containers manufacturing, bread baking and milling, dairy processing, wine making, and fleet management.

The hotel benchmarking case studies are available without charge from:

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