

# Contract guarantees energy savings at Christchurch Polytech



Christchurch Polytechnic's energy performance contract with Honeywell has cut energy use by 18% in two years, while conditions have improved. ▶

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A partnership between Christchurch Polytechnic Institute of Technology (CPIT) and building facilities experts Honeywell New Zealand Ltd is steadily increasing the polytechnic's energy efficiency in a six-year staged programme.

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From fashion design to broadcasting studios, mechanical workshops and electronics testing laboratories – CPIT offers the gamut of educational facilities.

It runs seven commercial kitchens, three welding workshops and two licensed training restaurants, catering for 25,000 students and 2000 staff. The city campus covers an entire city block near the Cathedral, and two other campuses are nearby.

Honeywell is a New Zealand pioneer of the arrangement called energy performance contracting, where it offers its client, generally a large institution, guaranteed energy savings, and the two partners benefit from the savings along agreed lines.

The client shares responsibility for energy management, usually investing in the most cost-effective energy efficiency upgrades and practices.

At CPIT, Honeywell has guaranteed the savings achieved over the six-year life of the contract will pay for the cost of the energy management programme. If no savings are achieved, Honeywell will meet any shortfall.

Honeywell benefits by getting a steady cashflow from CPIT. CPIT gets more certainty in its budgeting. At the end of the contract, the parties can decide to continue or call it quits.

It's in Honeywell's interests to run the facility efficiently while still providing agreed levels of service – the lights must still go on and the rooms must be warm or cool enough for comfort.

In Christchurch, Honeywell also has a performance contract with the district court. Honeywell and the Auckland District Court were highly commended in the 2001 EnergyWise Awards for the success of their energy performance contract.

Honeywell employs facilities manager Neville Smith to look after CPIT. He also takes care of Christchurch District Court, where he works from an office on-site. He maintains frequent contact with the CPIT facilities management team.

Energy performance contracting is common in North America and its use has steadily increased in Australia during the last 10 years.

Key to the contract's success is a clear understanding of exactly what the two parties expect of each other. It's not going to work if it is open to disputes about the benchmark against which energy consumption is measured, or the levels of service required.

If the client organisation is a publicly-funded facility such as a tertiary institution or hospital, it can apply to EECA for a Crown Energy Efficiency Loan for capital spending on energy efficiency.

The CPIT project is continuously monitored and has targets set and updated by Honeywell and CPIT staff. The CPIT management team receives quarterly reports.

## How it started

At Christchurch Polytechnic, the initiative came into effect in early 2002, prompted by the former director of facilities management, Murray Humm.

Humm has since been replaced by Grant McPhail, who previously won an energy manager award in the 2001 EnergyWise Awards for his energy efficiency work at Landcare Research, Lincoln, so the polytechnic is still in good hands.

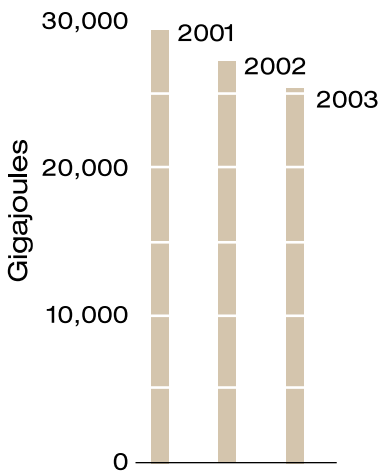
Before the performance contract came into force, CPIT already had a Honeywell XBS building management system installed. Energy and utilities supervisor Ian Milne, who's worked at CPIT for 26 years, first became involved with Honeywell around 13 years ago.

In keeping with its expertise in building management systems, Honeywell has concentrated mainly on improving the mechanical services – air conditioning, ventilation and heating – both by upgrading the equipment and by altering the timing so equipment is not running in unoccupied rooms. Occupancy sensors have been fitted in some rooms to control lighting.

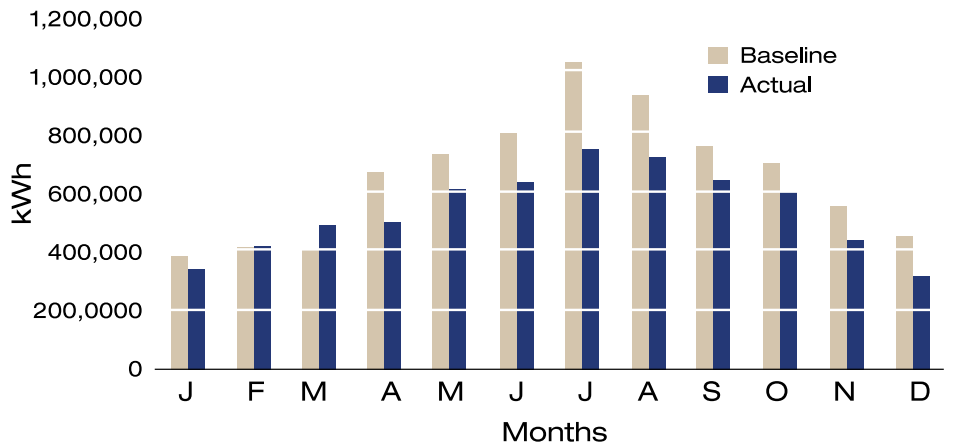
Milne says the lighting was already pretty good, with efficient fluorescent tubes used as a matter of course: "Most of the new buildings have T8s. There aren't any [older, less efficient] 38 mm tubes. We have CFLs everywhere I can put them." ►



Christchurch Polytechnic energy consumption



Christchurch Polytechnic - 2003 electricity consumption Actual consumption against baseline



BELOW: THE EXISTING HONEYWELL BUILDING MANAGEMENT SYSTEM WAS EXPANDED TO INCORPORATE EXTRA FUNCTIONS AT THE MAIN CAMPUS.

- ALX BLOCK**
  - INSTALLED NEW DAMPER, FAN, VARIABLE FREQUENCY DRIVE AND AIR QUALITY SENSING EQUIPMENT FOR ATRIUM.
  - OPTIMISED EXISTING CONTROLS TO SUIT BUILDING OCCUPANCY PATTERNS
- NS BLOCK**
  - INSTALLED NEW CONTROLLERS FOR CHILLER PLANT, WITH VARIABLE FREQUENCY DRIVES AND DUCT PRESSURE SENSING FOR SUPPLY AND RETURN AIR FANS.
  - INSTALLED FRESH AIR CONTROL FOR FAN COIL UNITS, AND HEATING AND CHILLED WATER CONTROL AND OCCUPANCY SENSING.
- C BLOCK AND E BLOCK**
  - INSTALLED NEW VALVES, ACTUATORS AND CONTROLLERS TO OPTIMISE BOILER OPERATION.



PICTURED IS THE CITY CAMPUS. NOT SHOWN: SULLIVAN AVE AND SEVEN OAKS CAMPUSES.



**TRADES ARE THE POLYTECHNIC'S TRADITIONAL STRENGTH BUT IT HAS EXPANDED TO THE ARTS AND NEW TECHNOLOGY, CATERING FOR LOCAL AND INTERNATIONAL STUDENTS.**

► The existing buildings aren't being retrofitted with insulation, but heating valves and tanks have been insulated. The windows have been solar-tinted. Says Milne: "It solves air conditioning problems and works well."

## Electricity contract

Before an energy performance contract begins, it's necessary to know what the base position is. Honeywell commissioned an energy audit. From this the two parties negotiated the strategy for carrying out the most cost-effective measures.

The fluctuations of the energy market could wreak havoc with an energy performance contract and CPIT is particularly exposed, with 50% of its supply bought on the spot market.

However, Honeywell caters for this with its software, Metrix, that works on the actual kilowatt-hours consumed, allowing for a realistic comparison of energy usage.

Metrix was developed by SRC Systems of Berkeley, California. It enables Honeywell to produce an adjusted baseline for each year of the programme, so each successive year is compared accurately with the original baseline year.

When the Polytechnic was renegotiating its contract with Meridian Energy there was little choice. It was at a time when the first post-deregulation hydro shortage left generator-retailers nervous about offering hedge contracts. Some schools whose previous fixed-price contracts had expired were having to buy all their electricity on the spot market. However, the Polytechnic belongs to a large buying group of tertiary education institutions and its contract with Meridian was thought at the time to be favourable.

Says Milne: "It worked out really well till last winter – we were ahead. But at one point the price hit \$90 a unit for an hour or so."

He says it is difficult to predict when the spot price will be high. "It could be any time – it could be 2.30 in the morning. One day we got an advisory from Meridian Energy that they were doing maintenance for two periods. For the morning one, when the price went up to \$90, we turned the heating off. Then in the evening before I went home I programmed a timer to switch off. I came in next morning, and the spot price hadn't changed at all during the night."

An important aspect of the energy management programme is to reduce CPIT's maximum demand. Network company Orion faces tight constraints on its capacity to distribute electricity, and has come up with strong incentives for electricity users to curb their peak demand. It operates "controlled demand" periods during which electricity users face serious costs if their electricity demand exceeds a certain level.

Milne says CPIT has its own way of dealing with supply constraints. "We use a ripple relay for the demand control period. It turns the heating and air conditioning off. You can drop it for an hour or two without people realising."

The existence of the performance contract and its regularly reporting to staff and management has raised the profile of energy management on campus.

The ripples spread into people's homes because energy-savings messages in staff emails seep into their general consciousness. CPIT has taken advantage of EECA's free "Switch-Off" stickers and posters to act as a continual reminder.

## Results

The project cost is \$472,000 for the six years. The guaranteed savings for year one are \$68,230, increasing to \$100,730 in year two. The calculations take into account the addition of new facilities and changes in the cost of electricity.

The price CPIT pays for energy has risen by 50% since the project began two years ago, but this does not prejudice the savings targets because the Metrix software works from an agreed baseline.

Milne is pleased with the way the contract has worked out. It could be thought of as a form of insurance against electricity price rises. "The returns are way beyond what were projected. If we hadn't done it, what would it have cost us last winter?" ■

## CREDITS

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