

## Auckland Airport – continuous improvement drives energy efficiency

Opened in 2008, Auckland Airport's new international passenger terminal is one of the first buildings in New Zealand to receive world-recognised accreditation for its sustainable and energy efficient design. Its success has inspired a formal energy management programme across the entire international terminal complex, which is already delivering results.

### Auckland Airport – serious about saving energy

As the main gateway into NZ, Auckland Airport's international passenger terminal is the first impression of this country for most overseas visitors. And in keeping with New Zealand's clean green image, the airport is continually seeking opportunities to improve energy efficiency and reduce environmental impact.

In 2007, the airport made a commitment to reduce its carbon footprint by 5% over the next five years (CO<sub>2</sub> emissions at that time were around 10,000 tonnes of carbon per annum). So when a new international pier was required to meet projected visitor growth, the board demanded best practice in energy efficient design.

### A world-leading design

The new \$50 million Pier B opened in October 2008 and was one of the first buildings in New Zealand to receive Leadership in Energy & Environmental Design (LEED) certification, a US qualification that recognises the best in sustainable building worldwide.

The roof of the building incorporates 300 square metres of photovoltaic cells, which produce 49,000 kWh every year towards lighting, as well as solar water heaters for hot water. The roof also collects 4000 cubic metres of rainwater a year, which is then used by the air-conditioning system's cooling towers. Other features such as low-flow fittings, lighting controls, glazing to manage solar gain and energy efficient equipment all play their part in reducing overall energy use in the building.

### Success drives further improvements

In 2009, inspired by Pier B's success, Auckland Airport management were keen to look for other opportunities to save energy and reduce their power bill. Previous monitoring had identified the airport's original international terminal building Pier A as a significant contributor to overall energy use.

The airport's Sustainability Advisor Martin Fryer approached EECA for advice on how to go about applying what they'd learned from Pier B to Pier A. EECA recommended that Auckland Airport employ an auditor to help identify improvements to Pier A that would provide the best return on Auckland Airport's investment.

### Payback within two years

In late 2009 the auditor conducted an energy audit of Pier A. The audit confirmed the potential for significant energy and cost savings. One of the main findings of the audit was that heating, ventilation and air conditioning (HVAC) accounted for more than 30% of the energy bill for the building complex – therefore HVAC was an important area for potential savings.

The auditor made a range of recommendations, categorised by capital expenditure against how long before the airport would see a return on their investment. Auckland Airport's board was pleasantly surprised to see that most of the potential improvements offered payback within two years.



Solar hot water heating saves 15,000 kWh of energy every year.

#### ✓ Key features

- 300 sqm photovoltaic roof panels (Pier B)
- Solar water heaters (Pier B)
- Rainwater recycled for cooling towers (Pier B)
- Low-flow water fittings (Pier B and Pier A)
- VFDs installed (Pier A)
- UVC HVAC coil cleaning (Pier B and Pier A)

#### ✓ Benefits

- Pier B internationally recognised by LEED accreditation
- 49,000 kWh solar energy produced pa
- 4000 m<sup>3</sup> rainwater recycled annually
- Pier A energy audit identified potential energy savings of 20% pa
- Total carbon emissions pa reduced by 10%
- Most recommendations have payback of less than two years

#### ✓ Sector relevance

- Commercial buildings

## Putting it into practice

One recommendation stood out as a 'quick win'. Installing a Variable Frequency Drives (VFD) on the terminal's central plant chilled water pump at a cost of \$5,000 will enable the motor to run at levels that more accurately meet varying cooling needs (instead of just switching on or off). VFD installation will be completed in December 2010 and will pay for itself in just over a year.

And, while a new HVAC coil cleaning and sterilisation system is a bigger ticket item, the auditor's report indicated this could easily save more than \$100,000 a year, with payback in less than two years. Two trials of the latest ultraviolet C (UVC) coil cleaning technology were conducted in August 2010, and the results have exceeded expectations – indicating that a new system will, in fact, save Auckland Airport over \$180,000 per annum.

## Testing times

The audit report advised the biggest savings overall could come from adjusting HVAC sensors to be less sensitive (currently half a degree can activate the building's cooling and heating system).

Caution was required with adjusting HVAC sensors, however, as the airport needed to take into account any equipment that must be stored at optimum temperatures. And with so many retailers as tenants, it is critical to ensure that the customer's experience remains unaffected by changes in temperature and lighting ambience.

Therefore, initiatives involving the lighting, HVAC and overall Building Management System (BMS) are being implemented using a phased approach from December 2010 onwards, with careful trials as required.

## Future focused

Overall, the initiatives identified by the auditor are expected to cost around \$500,000 in capital expenditure to implement, and save the company 20% of their energy costs, as well as reduce carbon emissions by more than 1,000 tonnes every year. Despite the necessarily cautious approach, Martin is still aiming to complete most of the auditor's recommendations for Pier A within the next 12 to 18 months.

By that stage, Auckland Airport will be looking for the next opportunity to reduce energy use. The benefits seen from Pier B and from the subsequent audit of Pier A have cemented the airport's commitment to their energy management programme, which now features formal monthly reporting on energy savings across the entire airport site.

And to ensure Auckland Airport can track their progress and savings, a new, more accurate energy monitoring system is currently being installed.

## Key personnel

Martin Fryer (Auckland Airport Sustainability Advisor)  
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### Auckland Airport perspectives

"The audit has put more of a focus on energy efficiency – while it's early days I've seen enough to know that energy use is going in the right direction – in fact it's reducing for the first time in many years."

**Martin Fryer** Auckland Airport  
Sustainability Advisor



"Over the years energy and conservation have become significant themes for aviation. A lot of what we can do is helping the airlines, because they are very exposed to the carbon footprint argument, impacted by the fact that New Zealand is on a long haul journey at the end of the world.

As a business, you've got to show strong leadership... reinforce that energy efficiency is tangible, and that it is important."

**Tony Gollin** COO,  
Auckland Airport

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