

Central Auckland building more energy efficient due to continuous commissioning™

More businesses are undertaking 'continuous commissioning' and are finding it not only cuts energy bills but identifies other possible improvements. Continuous commissioning examines every aspect of how energy is used and controlled in a building.

After investigations and monitoring, adjustments are made and the effects of those adjustments carefully monitored. The process is repeated until energy use in the Heating, Ventilation and Air Conditioning (HVAC) system is optimised; that is, the energy used to achieve and maintain environmental conditions is minimised.

Aspec Properties, a New Zealand property management company, owns 57 Wellington Street in central Auckland. A three storey glass and steel office block built in 2002, it had been reconfigured to meet the needs of each successive tenant since it was built. These changes were often done without considering the impact on energy use. Over time, it became very inefficient.

ECOsysteMS carried out continuous commissioning at the site to optimise the building systems for the current building configuration. The project has been very worthwhile, with the recommended changes predicted to save about \$45,000 per year – paying themselves back within 3 years.

Project aims to save at least 20% energy costs

The Wellington Street building should have been performing much better than it was in terms of energy efficiency. Its HVAC systems were less than 10 years old, but there were tenant complaints as well as excessive electricity use.

The aim of the project was to investigate why it was using so much energy and, once that was determined, to make some changes without any loss of comfort. ECOsysteMS was confident savings of 20-40% were possible through continuous commissioning, low cost maintenance and capital improvements.

How was it done?

ECOsysteMS carried out a detailed site and energy survey with a comprehensive analysis of the building's operation. Energy tariffs and line charges were reviewed, equipment and controls fine-tuned and energy conservation measures identified. Then a plan was developed to monitor and verify savings.

In all, 12 recommendations were made which were estimated to collectively save about \$45,000 a year in energy use. However, initial estimates for the first two initiatives put into place – changes to the chillers and cold water flow within the HVAC – appear to show almost twice the predicted savings.

Energy conservation measures targeted

The two recommended HVAC energy conservation measures with the biggest opportunity for improvement were:

- to reprogramme the way the chillers were staged and sequenced.
- to reprogramme the cooling demand requirements from each controller in the HVAC to provide the optimum temperature for the chilled water.

By making changes to the chillers this way, the chilled water temperature can float between 6°C and 11°C. It now operates at the upper end of the range where it previously operated mostly around 6°C.

Prior to this, the system was over cooling using excessively chilled water only to have it reheated by the electric heating elements to maintain comfort. This 'fighting' of building heating and cooling systems is not uncommon and is a major source of energy waste in buildings.



The Auckland building benefiting from 'continuous commissioning'.

✓ Key features

- 'Continuous commissioning'
- Process identified 12 opportunities for improving energy with payback period of less than 3 years if all implemented

✓ Key benefits

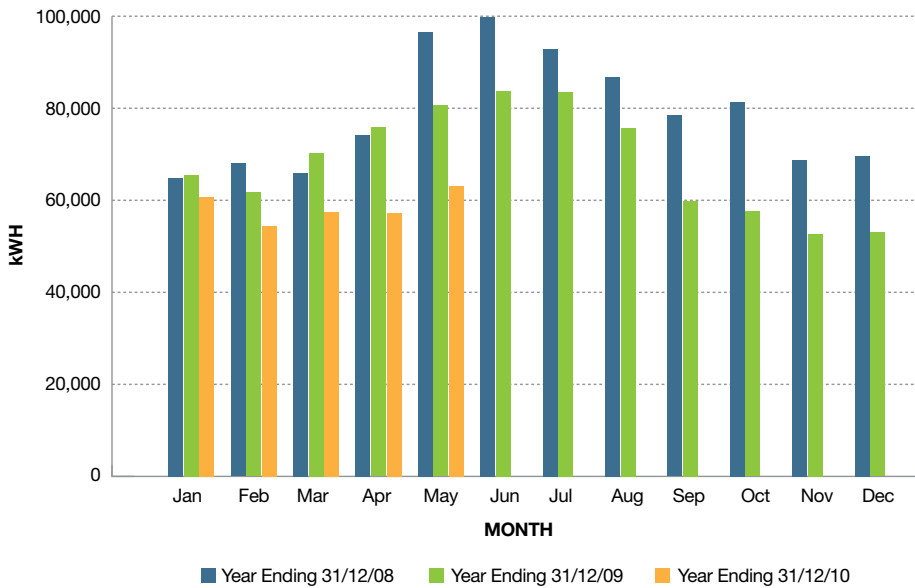
- Approx 20% energy reduction through chiller and cooling demand re-programming
- Reduced maintenance costs for landlord
- Increased tenant satisfaction

✓ Sector relevance

- Owners and managers of commercial buildings

A number of faulty chilled water valves were also identified. Repairing these will mean more energy savings.

Comparison of electricity use 2008 – 2010



What are the benefits?

In addition to energy savings, the elimination of 'fighting' between the heating and cooling systems has resulted in further benefits for the building owner and tenants. These benefits include extending equipment life of the chillers by reducing their use and better tenant comfort and a subsequent reduction in complaints.

What are the lessons for other commercial building owners and tenants?

- When buildings are reconfigured, careful consideration needs to be given to the impact on the operation of the HVAC systems and the resulting energy consumption.
- Optimised HVAC systems reduce maintenance costs.
- Ongoing monitoring identifies variations in energy consumption, allowing issues to be addressed earlier.
- Systems optimised for energy efficiency usually experience enhanced occupant comfort and increased client satisfaction.

The key to continuous commissioning is monitoring. Eventually the plan is for the metering information to be posted on the internet for easy access. This will give an incentive to all building occupants to take an interest in energy savings.

For more information

Contact the Energy Management Association of New Zealand
www.emanz.org.nz

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For more information contact The Energy Efficiency and Conservation Authority:

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ECOsystems' perspective

Gary Root, Energy Integrator:

"Getting existing buildings back to prime operating conditions and keeping them there is a real challenge. However it is possible. It's cost-effective and gives better occupant comfort. It just makes sense from a business point of view, but it often hasn't been done due to a lack of education and training. It takes a certain skill-set to do it.

"People do not realise how much they could save. If building owners made a concerted effort to spend the necessary funds on improving facilities, they could easily save 20% of their energy use.

"Sustainable changes to building structures need to be made in the long term in order to get energy savings to become permanent. Ideally we would like to really ratchet back commercial energy use in New Zealand so those new transmission line investments don't have to be made."