



SAVING ENERGY AND THE ENVIRONMENT

ECOsystems was established in 1995 to save energy and the environment. Since then, we have won seven National awards for our energy efficiency projects, including two awards for our projects with Colleges.

Our vision is intelligent environments that simply respond from wherever you choose, to minimise energy use, save the environment and maximise comfort and security.

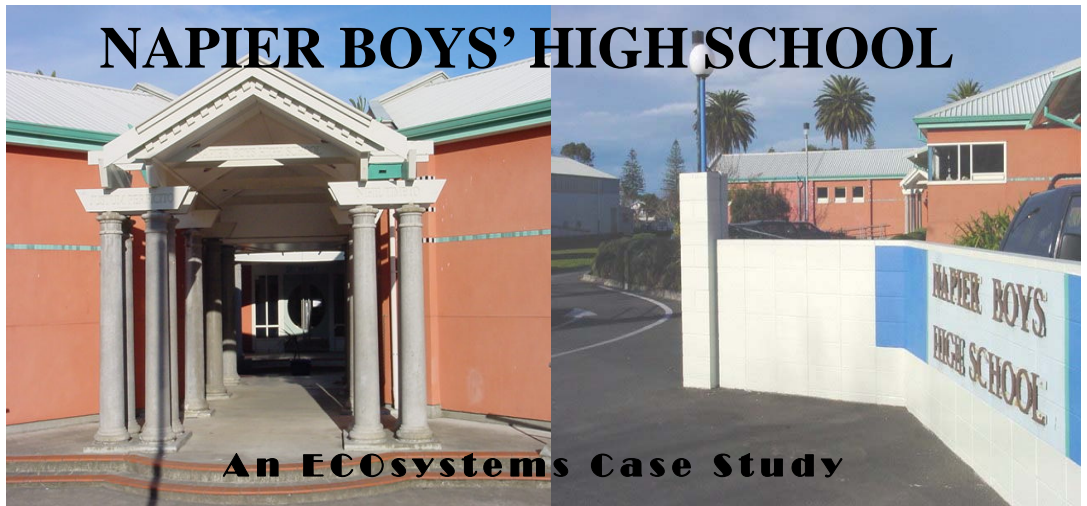
REDUCE ENERGY COSTS

Simply control your lighting, heating, cooling, appliances and hot water from a web browser

REDUCE HARMFUL GREENHOUSE GASES

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NAPIER BOYS' HIGH SCHOOL

An ECOsystems Case Study

BACKGROUND

Following discussions between Napier Boys' High School and ECOsystems, an energy audit of the school was commissioned.

As a result of the audit in August 2004, ECOsystems identified significant potential for savings.

It was predicted that the energy upgrade would reduce energy consumption and demand at the site as well as reduce maintenance costs.

These findings were presented to Napier Boys' High School, who contracted ECOsystems to manage an energy efficiency upgrade beginning in December 2004.

The upgrade was completed in January 2005.

THE SCHOOL

Napier Boys' High School was founded in 1926 and is steeped in tradition. It has seen many changes over the years and is made up of nine main blocks plus separate gymnasiums, pavilion and hostels.

The main electrical meter supplies the majority of the school. There is a separate meter for the hostel and associated buildings and another for the pool, gymnasiums and pavilion area.

The main school is supplied by a coal fired boiler. Stand alone gas heating is used to heat a small number of classrooms and gas is also used in the science block.

The hostel has seven main living quarters in close proximity to common facilities: laundry, kitchen, dining room, offices and bathroom facilities.

Hostel Heating is provided via a hot water loop heated by a gas boiler. Gas is used in the kitchen for cooking while the laundry uses gas for hot water and drying facilities.

RECOMMENDATIONS

Napier Boys' High School were interested in energy savings and control of lighting, heating and hot water throughout the school.

ECOsystems proposed to control these through the Energy Automation System (EAS) with a C-Bus Energy Management System. The proposal also recommended upgrading of selected light fittings, decommissioning/wrapping selected hot water cylinders, installing low flow showerheads, providing ongoing monthly energy monitoring and help to develop an Energy Efficiency Policy.

UPGRADE SUMMARY

Savings will be made through energy savings and reduced maintenance.

- **Lighting**
Control lighting running hours of specified rooms through C-Bus Energy Management System.
247 twin fittings being converted to single fittings.
270 incandescents being converted to compact fluorescents.



- **Electric Heating**
Centralised control in Campbell Block, through the C-Bus System interfaced with EAS for scheduling of running hours.

- **Outside Lighting**
6 metal halide floods being converted to 250W sodiums.

- **Hot Water**
Decommission specified hot water cylinders. Wrap specified hot water cylinders.
Install low flow showerheads in selected hostel blocks.



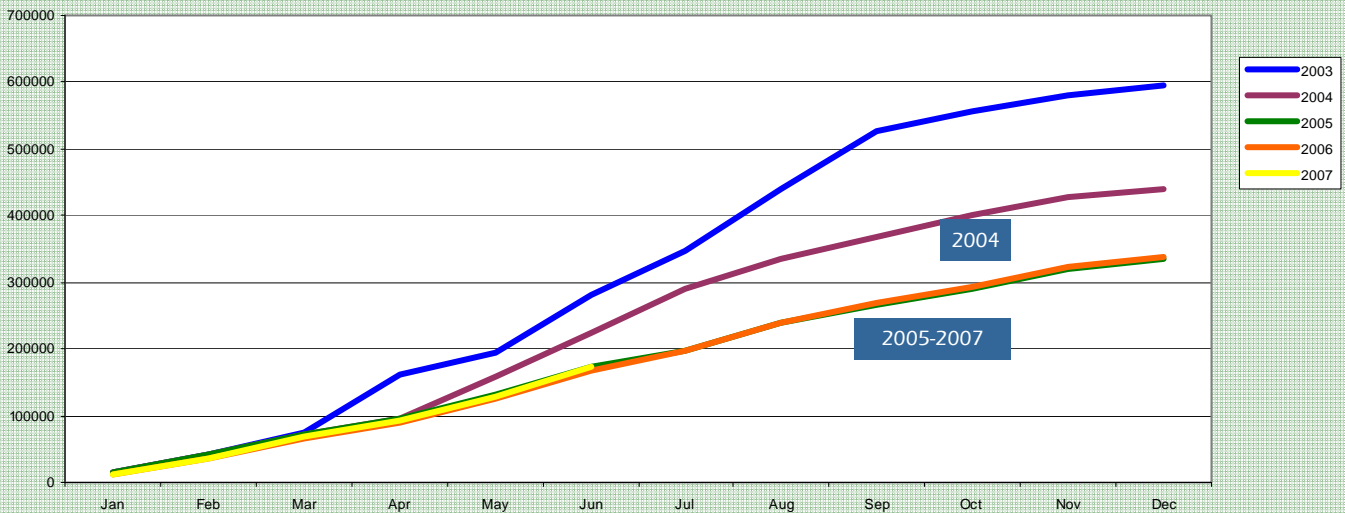
- **Gas Boiler Heating**
Centralised control through EAS providing optimisation, Scheduling and OAT lockout.

- **New Buildings**
ECOsystems will work with the school to ensure energy efficiency is addressed in all new alterations/developments.

- **Ongoing Monitoring**
Ongoing monthly monitoring is offered.

- **Energy Efficiency Policy Development**
Help with policy development is offered.

Napier Boys' High School Cumulative kwh used - All energy sources



BENEFITS OF THE UPGRADE

Benefits have included immediate savings on energy costs, efficient temperature and lighting control, ease of adjusting schedules through the EAS front-end, including such things as fine-tuning pre-heat times and addressing individual classroom temperature when necessary.

ENERGY USAGE AND PAYBACK

The graph above shows the cumulative monthly electricity, gas, coal and water costs over the past five years. As you can see, the installation of the energy upgrade has had an immediate effect on energy costs.

UPGRADE SUMMARY

The project can be broken down into lighting and heating control

Lighting—Upgrade

Using the latest in fluorescent technology and design, existing light fittings were replaced with more energy efficient light fittings that maintained light levels and reduced energy consumption.

Lighting—Control

Lighting is controlled by utilising scheduling and ensuring only occupied classrooms have lighting to reduce consumption and maximum demand.

Heating Control

Fan heaters (in classrooms) are controlled by the EAS via C-Bus relays to operate within scheduled hours and load-shed when peak demands are high thus reducing maximum demand.

Air-conditioning units are controlled through the EAS via C-Bus infra-red transmitters giving control over these based on temperature schedule and demand.

All three heating outputs are scheduled and temperature controlled to reduce unnecessary output and to minimise demand charges.

By reducing base load figures through the introduction of energy efficient lighting and the control of space-heating and hot water through the EAS, significant savings have been made on maximum demand charges.

We monitor and graph results for our clients to prove that the results we predicted actually occur

THE ENERGY AUTOMATION SYSTEM

The EAS and C-Bus units are located throughout the site.

The EAS monitors outside and classroom temperatures to optimise classroom heating.

The times the heaters operate are controlled by schedules within the control system.



If you would like further information on how ECOsystems can improve the energy efficiency of your College, please contact us on +64 4 566 3666 or view our website www.eco.co.nz
This Case Study was produced in 2007

ECOsystems Limited