



SAVING ENERGY AND THE ENVIRONMENT

# HUTT INTERNATIONAL BOYS' SCHOOL

## An ECOsystems Case Study

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

Our vision is to enable our business partners to control their energy efficient building services from wherever they choose, to minimise energy use, save the environment and maximise comfort and security.



### BACKGROUND

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

As a result of the audit in July 2005, 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 Hutt International Boys' School, who contracted ECOsystems to manage an energy efficiency upgrade beginning in July 2005.

The upgrade was completed in September 2005.

Hutt International Boys' School, founded in 1991, is located in Silverstream, Upper Hutt. An internationally recognised school, its focus is on quality education and it has an enrolment of around 650 pupils.

The school is made up of six main blocks plus a separate gymnasium. The majority of the school buildings are re-locatable prefabs.

The site has undergone redevelopment over the previous years to combine all facilities onto one site. A new classroom block and administration building were added in early 2004, while several classrooms have either been upgraded or moved.

The main electrical meter supplies all of the school. This meter was added to accommodate the redevelopment. Gas is used only in science laboratories and for small scale heating.

When comparing the two sources of energy used on site, electricity consumption dominates both the quantity consumed and the dollars spent. So much so that gas does not equate to more than 1% of overall consumption or dollars spent.

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

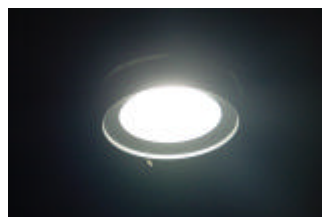
ECOsystems proposed to control these through the Energy Automation System (EAS) with a C-Bus Energy Management System. The proposal also recommended reducing peak demand, upgrading of selected light fittings, providing ongoing monthly energy monitoring and to help develop an Energy Efficiency Policy.

The upgrade was based around an Energy Automation System (EAS) that controls the library radiant heaters, air conditioning and load control, and a C-Bus energy management system for lighting, fan heater and hot water control.

The integration of the EAS with the C-Bus system, for the control of the lighting and heating, is achieved through innovative interfaces designed by ECOsystems. Full control of the site is managed through a web browser.

The energy upgrade was largely completed during school holidays with minimal impact on normal school operations.

Another main advantage is that the site can be remotely monitored and controlled if necessary, for example an unscheduled evening meeting requiring heating.



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The project can be broken down into three areas - lighting, heating control and peak demand.

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



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.

Radiant heaters (in Library) are controlled via solid state relays (SSR's). These are also controlled through scheduling and load shed when the school maximum demand is high.

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.

Due to almost exclusive use of electricity at the school, and lack of control over energy usage, peak demand charges prior to the ECOsystems upgrade were very high.

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.

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.

The temperatures of the classrooms in A, B, C, D and M blocks are measured by C-Bus temperature sensors.

These are interfaced with the Energy Automation System that in turn controls the lighting and heating schedules, and load shedding.

The EAS also monitors the half hour demand on site and if the demand is predicted to go above a preset level, loads are adjusted to reduce the demand that in turn minimises costly network line charges.

## BENEFITS OF THE UPGRADE

Benefits have included the 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.



In the Reception / Atrium area, extensive use of glass has been made to enhance natural light levels.

Light level sensors were installed and different lighting stages have been used to reduce lighting levels when natural daylight is sufficient.

An unforeseen benefit has been the indication that a class period is over due to the lights turning off. This is a benefit to HIBS as they don't use a bell to indicate the end of class time.

## ELECTRICITY USAGE AND PAYBACK

The graph below shows the cumulative monthly electricity costs over the past two years. As you can see, the installation of the energy upgrade has had an immediate effect on energy costs.

Since the upgrade started in July 2005, a difference of 52,749kWh has already been achieved compared with the same period the previous year.

Funding was provided through the interest-free Crown Loan Scheme.

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](http://www.eco.co.nz)

**ECOsystems Limited**

Hutt International Boys' School  
Cumulative Electricity Expense (\$)

