



# Smart solutions reduces school power bill by 30%

Case Study



At a time when power costs in Australia are soaring, a Queensland high school has bucked the trend, reducing its electricity bill by almost 30 per cent and training a new generation of Energy Warriors in the process.

Beenleigh State High School in the City of Logan, south of Brisbane, was one of 35 Queensland state schools selected to participate in a trial conducted by the Queensland Department of Education and Training, in conjunction with ERM Power, who are experts in electricity generation, retailing and energy management solutions for businesses in Australia, as well as in select markets in the US.

The Queensland Department of Education, concerned by the rate at which electricity consumption was climbing in schools and the pressure this was putting on operating budgets, engaged ERM to see what could be done to address the problem.

## Key outcomes



30%

Annual savings on school electricity bill



#### Kids engaged

Education on energy efficiency & sustainability



#### Re-invest

\$43,000 savings can be put to core education service delivery

# Data-driven, evidence based decisions

The trial at Beenleigh State High began with comprehensive, state-of-the-art data analysis. ERM's Energy Solutions team analysed data sets from over 400 schools, establishing benchmarks and models specifically for schools^.

An energy audit of the school was conducted involving desktop assessment, bill analysis, client information and onsite inspections. It established that Beenleigh State High had an above-average energy consumption per student.

This methodology can be applied to any organisation to provide product-agnostic solutions tailored to industry, size, geography and energy load profile.

School principal Matt O'Hanlon says the school knew they were consuming too much energy, having seen their electricity bills climbing, but they weren't sure what to do to arrest the problem.

"What was really interesting was the ERM guys were able to show us just how we were charged for our electricity, and that was a real eye opener," says O'Hanlon.

"That then triggered a whole range of ideas on how we could save on energy costs."

The audit pinpointed air-conditioning (66 per cent), lighting (23 per cent) and hot water systems (6 per cent) as the major contributors to the school's rising energy bills.

#### Share of maximum demand

**HVAC Systems** 66%

23% Lighting

Hot Water Systems 4% Refrigerator Units Computers

Based on these findings, ERM designed a holistic energy efficiency program tailored specifically for the school. This comprised an end-toend solution covering supply, installation and support, an implementation schedule, estimates of potential savings, an expenditure budget and a projected payback period.



#### Phase 1 - Action plan

The rollout of the program occurred in two phases. The first involved monitoring consumption in near real-time and sending notifications via ERM's Demand Alerter software to encourage behaviour moderation at the school when demand was peaking.

The school receives alerts by SMS and email whenever Demand Alerter predicts a peak demand period approaching, says ERM's energy efficiency consultant Peter Goggin.

"The data analytics we've done on the school show a pretty much straight-line correlation between temperatures above 30 degrees and high demand," says Goggin. "It's largely about air-conditioning use."

Goggin says ERM's demand alerts factor in prior consumption patterns as well as current weather forecasts. Triggered by demand thresholds set to achieve savings, they give the school enough lead time to act to keep their maximum demand below the target level.

## Phase 2 - Efficiency upgrade

The second phase of the rollout involved implementing a tailored energy efficiency upgrade to reduce the school's energy consumption.

To reduce the air-conditioning load, ERM installed:

- heat-reflective roof coating to four school buildings already earmarked for roof maintenance;
- air-conditioning occupancy sensors in five rooms; and
- thermostat controls in multiple airconditioning units.

The classroom lighting solution focused on replacing over 1700 T8 and T5 adaptor fluorescent tubes with highly efficient LED tubes, and multiple metal halide lights with LED Highbays.

To minimise the impact of hot water systems on demand, timers were installed on multiple hot water heaters to ensure heating occurred during off-peak hours at cheaper energy rates.

# What are demand charges?

Demand charges form a portion of network charges, which account for about half of an overall electricity bill. Customers are charged for demand in kVA using the highest recorded demand for power during a billing period. This is the maximum amount of electricity supplied in a given interval (usually 15 or 30 minutes). This is particularly important for schools to be aware of in the seasons when demand tends to increase with the use of air-conditioning.

Based on whatever this peak reaches, even if only for a single interval, the distributor then bills the customer for network demand charges at that 'maximum demand' rate for the full billing period, sometimes up to a whole year and this can lead to unnecessarily high charges.

ERM's Demand Alerter software monitors meter data in near real time and automatically alerts customers via SMS and email that their demand is approaching a predetermined maximum demand target. This advance warning enables customers to adjust their electricity consumption to keep their maximum demand below this target, thereby minimising demand charges and saving money.

## **Project overview**

Project cost	\$130,000 
Project duration	September 2015 to June 2016
Phase 1:	
Demand Alerter (November 2015 to March 2016)	
Energy savings (total)	45,400 kWh
Demand savings (total)	290 kVA
Actual savings on bill (total)	\$10,600
Total tCO2e reductions	40.4 tonnes
Phase 2:	
Energy Efficiency Upgrade (April 2016)	
Energy savings (per month)	15,600 kWh
Demand savings (per month)	91 kVA
Actual savings on bill (per month)	\$3,000
Total tCO2e reductions	13.8 tonnes
Payback (at current savings levels)	3.2 years

# Energy Warriors – Student Activation

The pre-emptive warnings from Demand Alerter have enabled the Beenleigh State High community to take control of their own energy costs.

When principal O'Hanlon receives an alert, he activates the school's Energy Warriors. These are a nominated group of Year 12 students who are responsible for reducing the school's energy usage, for example by shutting down air-conditioners and lights.

"We've found the best group to work with are the student leaders, because they are in classes, they have good relationships with teachers and they can sell it to other kids a lot better than I can," says O'Hanlon.

"They actually go around when they know the alert's on and they'll turn power off and encourage their teachers to do so. We've seen the data from ERM, and when we action after an alert we can see what the drop in power is."

The students are motivated to do this with an incentive that is linked to a reduction in price of their school formal tickets.

"When you can start to give students ideas around 'if we save this much money, we can do this', it has much more meaning to them," says O'Hanlon.

#### Immediate benefits

In the initial phase of the program the school was quickly able to slash its chargeable kVA demand, saving about \$10,600 across the summer months. The extent of the savings came as a very pleasant surprise, says Christine McCarthy, Beenleigh State High's business services manager.

"We were amazed by the level of savings achieved in such a short time," says McCarthy. "I just never understood before that there was a way for us to control our electricity costs. Everyone was blown away."

The implementation of phase two saw the school's electricity cost per student drop by 13 per cent at a time when this cost was growing on average by 18 per cent in other schools.

For the year May 2016 to April 2017, the school realised average monthly savings of \$3600, and reduced its carbon emissions footprint by 145 tonnes.

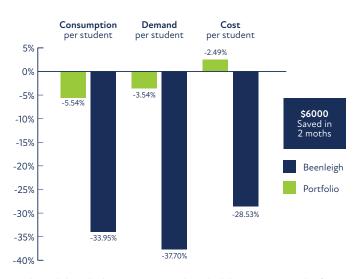
McCarthy says the school is reaping the benefits of its increased efficiency, and intends to keep building on them.

"We are confident we can continue the good work started by ERM to keep our energy costs down," she says.

"The savings will inevitably be passed on to our students and teachers in the form of improvements to facilities and additional teaching resources."

Energy savings for the school continue with upgrades to lighting on sports fields.

#### Summary of Variation Beenleigh SHS v Portfolio



This graph shows the change in consumption, demand and electricity cost per student for May and June 2016 to May and June period over the previous 3 years for Beenleigh SHS and other South East Queensland high schools supplied by ERM Power.

#### **About ERM Power**

ERM Power is a fast-growing Australian company specialising in electricity retailing and leading energy management solutions for business. ERM only serves businesses, and works with over 45,000 of them in Australia – both in the commercial & industrial sector and the small to medium business market. The company's award-winning customer focus has seen them grow to become the second largest electricity retailer to commercial and industrials in Australia. Harnessing the power of people, process and technology, ERM develop and deliver innovative customer solutions that help organisations manage their energy consumption more efficiently. Using bespoke solutions and expert advice they deliver customers smart software, data analytics and an expanding suite of energy-efficiency solutions.