



Energy Efficiency and
Conservation Authority
Te Tari Tiaki Pūngao

ISSUE 5 · AUTUMN 2010

NEWS



THE RENAISSANCE OF BIOENERGY

'Clean tech' of the
future P6



SKYCITY REACHING FOR THE SUN

Solar water heating
cuts emissions P12



About EECA News

EECA News is issued three times a year and is also available to download free from the EECA website.

In addition, we'll keep you informed with a shorter EECA E-News update in between issues of EECA News. If you would like to be included on the email list to receive this, please email news@eeca.govt.nz

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New Zealand Sustainable Building Conference (SB10)

EECA is proud to be a sponsor of the New Zealand Sustainable Building Conference (SB10: Transformation and innovation), which is on in Wellington from 26 – 28 May 2010.

It brings together local and international speakers to look at innovative, high-performance and low-impact approaches to developing, maintaining and retrofitting for a sustainable built environment.

The conference is aimed at a wide range of industry stakeholders and there are still places available – visit www.sb10.org.nz now to register.

From the Chief Executive

Mike Underhill · Chief Executive · EECA

One of the stand-out features of the last quarter is the continued interest in the Warm Up New Zealand: Heat Smart programme. In the nine months from July last year, 37,500 homes have benefited under the scheme, which is well up on the 27,500 target for the whole first year.

This is good news. Insulation makes a real difference to the warmth and comfort of a home, it makes it easier and cheaper to heat and it makes a home much healthier – all extremely worthwhile outcomes.

But it hasn't been all plain sailing.

The problems they have experienced with the home insulation scheme in Australia have raised questions about the programme here. But the situation in Australia is very different from the one we have here. For starters, we use different products – for example, the foil that has been the cause of some fatal accidents over there is not used in our scheme.

We have also taken a tighter approach to the administration of our scheme. To take part in our scheme, businesses had to go through a rigorous selection process and, on acceptance, sign up to contracts that stipulate quality standards, maximum prices they can charge, a self-auditing regime and service delivery standards.

Overseeing participation in this way means we have greater control over the work being done and, unfortunately, this has proved to be necessary to ensure we get the results we want in the first months of the programme.

On top of the service providers' own quality systems, EECA operates a strict auditing regime, designed to ensure all houses are done to the highest standard.

Disappointingly, the first audit results showed the industry has some work

to do to meet these standards. Quality issues are unacceptable to EECA, and the tight administrative rules give us the powers to take immediate actions to put things right.

We doubled the number of audits we are doing up to about 10% of total installations. We are imposing serious financial penalties on those businesses that don't meet standards. We are operating a 'three strikes and you're out' policy that will see anyone who isn't up to scratch kicked off the programme. We are also offering more training support to help service providers ensure all their crews know the standards that are expected of them.

Having a robust quality and auditing process means we can identify and address issues early in the programme. And this is exactly what is happening. We're seeing a real improvement, and I'm confident we'll see even more

On top of the service providers' own quality systems, EECA operates a strict auditing regime, designed to ensure all houses are done to the highest standard.

improvement as we continue to work with service providers and enforce quality requirements.

Earlier this year, a report that EECA commissioned made the headlines because, among other things, it pointed out that, for many of our houses, especially in the South, you would need



to do more than just insulate if you wanted to bring them up to world best practice standards. This is not news to me. Ask anyone who has been a student in Dunedin and they will tell you what we are dealing with here. Poorly constructed, old draughty houses that would need a massive makeover to make them warm and comfortable – and that comes with a very high price tag.

The insulation programme is designed to do what are the most effective, practical measures, given the cost and the size of the job across the country. And as the report concluded – these measures certainly make a difference.

Installing ceiling and underfloor insulation into houses, including in the South, slows the rate of heat loss. Then, if you heat them properly, they will be much warmer. Not perfect, but a whole lot better than they were. We know this for a fact because the people who live in these houses and have had the work done tell us what a difference it has made.

This is what the Warm Up New Zealand: Heat Smart programme sets out to do – help insulate and heat our homes so that we can be more comfortable, healthier and use less energy, and we are achieving this on a scale we have never seen before. ■

From the Boardroom

Toni Owen · Board Member · EECA



What is the single biggest opportunity for New Zealand in the area of energy efficiency or renewable energy?

In my view, it's education.

While New Zealanders are good at saving a lot of energy in short bursts during an energy shortage, it's rarely sustained over a longer period – ingrained habits can be hard to break.

By educating our youth we can ensure that the adults of tomorrow will automatically think energy efficiency when making decisions, whether they're purchasing a house or car, or simply living their everyday lives.

Once energy efficiency is a way of life to individuals, then it will spread into the way we do business. That is where the real gains are to be made. New Zealand is a country of small businesses and there's huge potential for energy savings. It ultimately leads to better business profitability and competitive advantage, which can only be good for the economy.

What is the biggest threat to the widespread uptake of energy efficiency?

I think it's the mindset of many New Zealanders.

From "not in my backyard" views on wind turbines and national grid upgrades, to "it's my right to use/waste as much energy as I want to because I pay for it" attitudes to personal energy consumption, these types of mindset have the

potential to derail a lot of good work. They also perpetuate inertia around energy management in the business sector.

Coupled with personal attitudes, energy efficiency has been hampered by bureaucracy at local and central government levels. A prime example of this is the complicated permitting requirements for solar water heating in some district council areas.

How are you personally reducing your carbon footprint?

Being a chartered accountant, I do things that stack up economically – and reducing your carbon footprint makes good economic sense!

My husband and I designed our house to harness the sun's free energy with passive solar design and good insulation, which helps minimise our household energy consumption.

A year ago we sold our gas-hungry Mazda RX8 and replaced it with a far more fuel efficient Ford Focus. My number one goal from every road trip is to beat the car's stated fuel consumption. We even compete to see who can get the best energy efficiency when driving over longer distances.

At work we have a rigorous 'turn it off' policy when things aren't being used, and it's amazing what a difference it makes. When we implemented the policy our office energy consumption dropped by 30%. ■

In each edition we ask an EECA Board Member their views on some of the big issues of the day.

ENERGY STAR® raises the bar for heat pumps



New requirements for ENERGY STAR heat pumps, which came into effect on 1 April, let consumers know that they'll get good heating performance when they need it the most.



ENERGY STAR has been helping Kiwis identify the most efficient heat pumps since 2006.

The approval mark has always required leading performance at 7°C, which is the temperature at which all heat pumps must be tested and labelled in New Zealand and Australia.

But because some heat pumps struggle to keep up between 0°C and 5°C, when they are more prone to icing up, ENERGY STAR now has an extra requirement for efficient performance in this temperature range.

"When it's cold outside, you need to know your heat pump's going to work

properly and heat your home efficiently – and that's what the new ENERGY STAR requirements are all about," says EECA's ENERGY STAR team manager Simon O'Brien.

For more about ENERGY STAR qualified heat pumps, visit www.energywise.govt.nz/heat-pumps



Television campaign captures businesses' attention

Most Kiwi businesses that saw the Energy Spot TV episodes intend to improve their energy efficiency, new research shows. Miranda James explains.



In February, the consumer-focused Energy Spot shifted to businesses when it showcased three companies' energy-saving success – initiatives that often paid for themselves within a year and could easily be picked up by others.

Research carried out in March by Synovate, showed that 55% of managers who had seen the episodes planned to improve their business energy efficiency and 14% had already done so.

However, the biggest barrier to managing energy is still time – both the time required to learn about it as well as put it into action – which means the value of energy efficiency needs constant reinforcement, says EECA marketing and communications manager Pat Murray.

The Energy Spot slots featured Carter Holt Harvey harnessing the energy-saving ideas of staff at its Kinleith pulp and paper mill; Novotel Hotels implementing low-cost measures which added to significant savings; and Winstone Aggregates shaving more than \$300,000 off its transport fuel costs.

“Flowing on from Energy Spot we’ve had good coverage in other media, which has helped boost our website visitors by more than 100%, where there are case studies to help businesses make an informed choice,” said Murray.

“We know companies face competing priorities, so it’s important to reiterate that energy management is well worth doing, and not too difficult.”

Synovate research director Horst Feldhaeuser said with this type of survey there was inevitably some over-reporting whereby good intentions don’t make it into action.

“However, even taking that into account, this is extremely positive feedback that shows the Energy Spot hits the mark for a business audience,” he said.

Lucy Acott, Accor Hospitality director of marketing New Zealand and Fiji, said staff had enjoyed the profile from Novotel being one of the businesses in the campaign.

“It’s been incredibly positive – we’ve had great unsolicited feedback from members of the public and staff are feeling very proud about having been featured. Accor has a 65-point environmental charter and it’s just part of the way we operate – so to get this level of recognition is fantastic.”

She said the episode was screened to a conference of general managers shortly after it launched. “These are the guys who are leading 32 hotels – and they were all really excited by it.”

The episodes will be re-screened later in the year. ■

The renaissance of bioenergy

Miranda James finds out how old-fashioned fuel has become the 'clean tech' of the future.

There's nothing high-tech about throwing a log on the fire. But wood – probably humankind's oldest fuel – is taking centre stage as a vital renewable energy of the future.

Bioenergy in the form of wood has numerous benefits. It's 100% renewable and virtually carbon neutral – as forests absorb CO₂ while they grow, balancing the gases released in combustion. Wood is cleaner burning than either coal or diesel, and is more cost-effective than many fossil fuels. It's also extremely versatile, being able to be used directly for heat, for electricity generation or to produce gas or liquid biofuel.

Capitalising on the energy potential of wood brings greater value for both wood processors and forest owners. Because wood chips and pellets are made from material that would otherwise be wasted, less goes to landfill and forest growers get a valuable new revenue stream.

Back in 2007, the Ministry of Agriculture and Forestry decided to support the nascent wood energy industry by

making \$8.4 million available over three years to fund demonstration projects and feasibility studies. EECA has administered the scheme in the form of its wood energy programme.

“New Zealand's bioenergy industry looked quite different when we started funding these projects,” says EECA wood energy team leader Shaun Bowler. “It's been very satisfying to see the growth over that time. We're now moving into a phase of promoting the learning rather than giving direct financial support, which feels appropriate for a rapidly maturing sector.”

To date, EECA's wood energy programme has funded 39 wood energy demonstration sites on both the supply and demand side. It has also funded 31 schools to switch boilers to wood chips or pellets. In total, these projects represent an additional annual demand for wood energy of over 0.8 PJ per year and are expected to reduce CO₂ emissions by over 50,000 tonnes per year. Supply side projects account for an additional 2.1 PJ per year of wood energy.



Prime Minister John Key and Solid Energy CEO Don Elder at the launch of Solid Energy's wood pellet plant in Taupo.

To date, EECA's wood energy programme has funded 39 wood energy demonstration sites on both the supply and demand side. It has also funded 31 schools to switch boilers to wood chips or pellets.

These projects have proved wood is reliable and cost-effective to provide direct heat for commercial and industrial use. There are also innovative initiatives that will help build the industry's knowledge capital significantly, including a co-generation project for electricity production, a project to manufacture liquid biofuel from woody biomass and a gasification project (combusting wood to produce gas which can be used for electricity generation or directly for heat).

As well as benefiting the consumers and producers of the fuel, the projects have helped boost local economies. Otago and Canterbury both now have maturing wood energy industries, with a cluster of wood energy consumers and suppliers. Local bioenergy industries are starting to develop in other regions – Southland, Nelson / Marlborough, Thames, the Bay of Plenty and Auckland. And as well as fuelling domestic demand, wood energy is set to become an important export earner.

Global demand for wood pellets is increasing exponentially, as Europe is turning to bioenergy as a key way to reduce carbon emissions and meet EU targets. Europe's wood pellet imports are estimated at around \$400 million a year, and demand is also growing in Asia.

Last month, Prime Minister John Key unveiled Solid Energy's new wood pellet plant at Taupo, which is New Zealand's largest, able to produce 40,000 tonnes of pellets a year. The company has a three-year, \$15 million export deal to Europe.

Crown Research Institute Scion has led the field in examining the potential for New Zealand's bioenergy. In its *Bioenergy Options* report published in 2007, it reported that there is existing potential in New Zealand for another 46 PJ per year of usable biomass, mostly in the form of wood residues from forestry and wood processing. This is on top of the 40 PJ of wood energy used

in 2008, as reported by the Ministry of Economic Development. Scion predicts that by 2030, our bioenergy potential could rise to 67 PJ per year, through increasing volumes of forest harvesting and wood processing.

Building on this, the Bioenergy Association of New Zealand (BANZ) and the New Zealand Forest Owners Association are jointly drafting a strategy for the industry moving forward, incorporating the views of forest owners, wood processors, consumers and government.

However, there's a lot of work to be done to convince New Zealanders. While Europeans are embracing new, clean wood technology, research carried out for EECA shows that Kiwi consumers are far less supportive of wood than of other sources of renewable energy. Only 35% say they favour wood energy, compared to 87% for solar, and 75% for hydro.

"There's much more to be done to raise awareness of the many advantages of wood energy, among consumers and business," says Bowler. "And we'll continue to work alongside the industry to do this." ■

Queenstown goes for renewable fuel

A biodiesel refuelling station now open for business in Queenstown is a good fit with the region's clean, green image, as Jane O'Loughlin learns.



EECA chief executive Mike Underhill opens the Queenstown biodiesel refuelling depot.

For visitors to Queenstown, the easy access to the pristine great outdoors and the stunning backdrop of snow-capped mountains goes hand in hand with the thrill of bungy jumping, white water rafting, skiing and the rest of the adrenalin-enhancing activities on offer in the resort town.

The only trouble is, most of those activities require transport, which usually means burning fossil fuels, emitting greenhouse gas emissions and air pollutants. Queenstown's tourism operators and other businesses recognise the need to show that '100% Pure' is more than a marketing slogan, and have embraced the chance to use a more sustainable vehicle fuel in the form of biodiesel-blended diesel.

The new fuel depot was officially opened by EECA's chief executive Mike Underhill in March, witnessed by a crowd of Queenstown's community leaders and business operators.

"It's very apt that Queenstown, which is well-known internationally as an attraction for tourists looking for a clean, green experience, should be the first in the country to provide a renewable fuel blend for local businesses such as tourism operators," Underhill said.

The depot, located at the Lakeview Holiday Park, five minutes' drive from the town, can be accessed by anyone who chooses to enter the cooperative, by paying a one-off \$50 charge per vehicle.

Already 30 Queenstown business operators have signed up to use the facility, which currently supplies a blend of 20% biodiesel and 80% diesel. The 'Biogold' biodiesel is supplied by Biodiesel New Zealand Ltd, produced from used cooking oil collected around the country.



“As a result of the Biodiesel Grants Scheme, the price is similar to what they normally pay for diesel.”

The biodiesel consortium model was initiated by Otago Polytechnic’s Centre for Sustainable Practice. EECA, which provided financial assistance to get the pilot programme off the ground, now hopes to see the model expanded into other regions.

EECA is also helping connect individual businesses with producers and distributors of biodiesel blends, through a promotional campaign running in industry magazines and other publications.

“Biodiesel has particular appeal for export or tourism businesses that want to show customers they are cutting greenhouse gas emissions,” biodiesel account manager Kirk Archibald said.

“As a result of the Biodiesel Grants Scheme, the price is similar to what they normally pay for diesel.”

A set of case studies explains the process that a number of New Zealand businesses – including tourism operations – have been through to switch to biodiesel blends.

“These case studies provide technical information which will help address any concerns businesses may have about trying a new fuel,” Archibald said.

“Plus, we have people on hand to answer questions and put callers in touch with the right technical advice.”

“EECA recommends that businesses check with their vehicle’s engine manufacturer and other engine and fuel experts about the level of blend that’s suitable for their vehicle.”

More information:

www.eeca.govt.nz/biofuels ■

What is biodiesel?

Biodiesel is a biofuel made from vegetable oils or animal fats, usually sold as a blend with ordinary mineral diesel fuel.

Biodiesel in New Zealand is likely to be produced from used cooking oil, tallow (a by-product of meat processing) or from rapeseed grown as a break crop.

How can I be confident New Zealand biofuels are good for the environment?

Biofuels vary in the way they are produced, with differing impacts on climate change, the environment and people. In order to provide New Zealanders with confidence that they are using biofuels that are sustainable, EECA has launched a web page which allows biofuel producers and retailers to report on the environmental credentials of their products. Currently the page is limited to biodiesel, but it is expected to include bioethanol in the future.

www.eeca.govt.nz/biofuels/sustainability

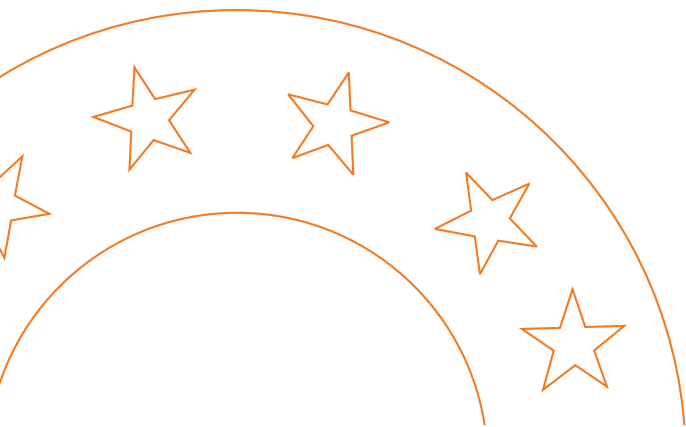
THIS FUEL IS BETTER
FOR THE ENVIRONMENT

FIND OUT HOW
eeca.govt.nz/biofuels

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Appliance efficiency on the up

Latest sales data for electrical products shows a record amount of energy has been saved through improved energy standards and better consumer information. Tamara Lee reports.

Better, more efficient products saved the country at least \$95 million of energy in the 2008-09 year, according to figures compiled by EECA.

Each year, suppliers of products included in the programme (that is, those products that must meet minimum energy performance and/or labelling requirements) are required to provide sales and product energy performance data to EECA.

The information is used to calculate energy savings and effectiveness of EECA's products programme, against projected product energy use if there were no energy use standards or product labelling in place. Data collection for the 2009-10 reporting cycle started on 1 April.

The 2008-09 results bring the value of the cumulative electricity savings from EECA's products programme to at least \$226 million since 2002.

"To put it in context, that's the amount of electricity used each year by the households of Napier, Hastings and Gisborne combined," says EECA products manager Terry Collins.

"As a country we're seeing big energy savings from very cost-effective product energy efficiency measures, and the benefits to consumers and businesses continue to grow as more products are included in our programme. These savings come at little or no initial cost to the consumer and accrue over the life of the product."

About product standards and labelling

Since 2002, EECA has been working with industry to improve the energy efficiency of

appliances and other products, primarily through minimum energy performance standards (MEPS) and mandatory energy rating labels for a growing number of product classes.

MEPS and mandatory labelling work in partnership by making sure the worst performers can't be sold in New Zealand, and then giving people the information they need to compare the energy use of products and factor it into their purchasing decisions. Together, they act to encourage manufacturers to continue striving for better energy efficiency in their products.

EECA also administers the voluntary ENERGY STAR mark, which helps people to easily identify the most efficient products in a category.

Internationally, product standards and labelling are regarded as a very cost-effective way to encourage energy efficiency and help towards energy security and climate change mitigation.

It's not just what you buy

While standards and labelling are helping slow the overall growth of appliance energy use, the flip side is that the number of appliances we use is increasing.

Computers and consumer electronics are eating up a growing portion of our electricity bills, and that could double by 2020 according to estimates from the International Energy Agency.

"We're also using our home electronics and computers for more hours a day and many appliances still use energy when you think they're turned off," says Collins.



Improved whiteware efficiency created over \$73 million in savings for 2008-09.

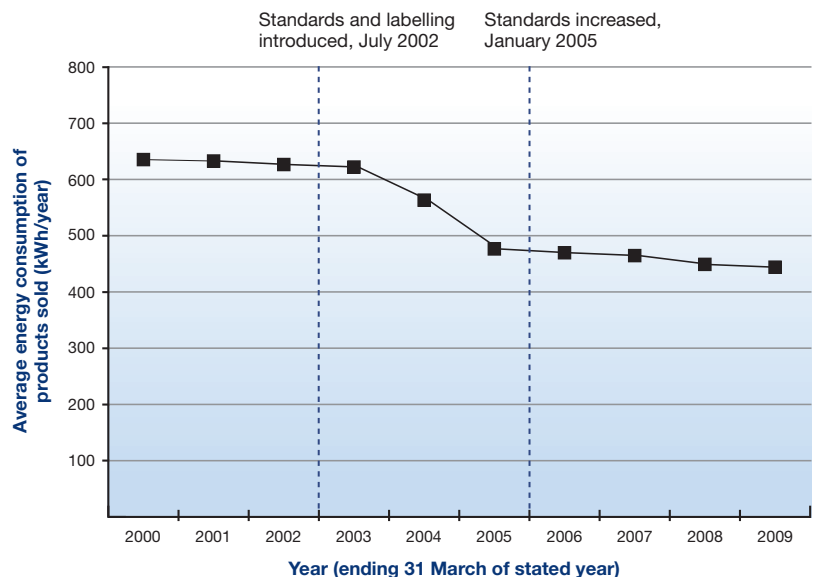
“Buying the right product for the job and using it properly can have a big impact on your electricity use, and that’s a message we push strongly through our ENERGYWISE™ consumer information campaign.”

2008-09 product sales data highlights

- Improved whiteware efficiency made the biggest contribution to reducing product energy use, with savings exceeding \$73 million (310 GWh) for the year.
- Between 2002 and 2009 domestic refrigeration efficiency improved by around 30%.
- Dishwasher efficiency improved by 14% and washing machine efficiency improved by 9%.
- Domestic heat pump sales continue to grow – an estimated 21% of homes now have a heat pump (up from 4% in 2000) and almost half of new home owners are installing heat pumps.
- Encouragingly, while the most efficient heat pumps (that is, those that carry the ENERGY STAR mark) constitute just 23% of the models available in the market, they make up almost 50% of total sales.
- The increasing trend towards more efficient heat pumps has resulted in energy savings of over \$16 million for the year.
- Refrigerated display cabinets have also seen an increase in efficiency recently. Energy savings for refrigerated display cabinets total 17 GWh, equating to \$2.5 million of savings for the year. ■

Computers and consumer electronics are eating up a growing portion of our electricity bills, and that could double by 2020 according to estimates from the International Energy Agency.

Energy consumption trends for household refrigeration appliances



This graph illustrates how energy efficiency standards and labelling impact on the energy use of the products and appliances we use. Between 2002 and 2009 domestic refrigeration efficiency improved by around 30%.

SkyCity reaching for the sun

Using solar power to heat water is one of a number of energy efficiency improvements SkyCity is making to reduce its environmental impact, as Jane O'Loughlin finds out.



Visitors to Auckland's most prominent landmark now have something new to look at alongside the fabulous views over the city. SkyCity has just installed a large solar water heating system on the roof of its hotel, to help cut energy use and greenhouse gas emissions. Visitors to the Sky Tower are able to see the installation from the tower, and also watch a short explanatory video about how the solar water heating system works, alongside real-time monitoring of how well the system is performing.

SkyCity hopes the prominent installation will inspire other businesses and households to consider ways to heat water more efficiently, as well as prove to be a sensible investment that will cut costs in the complex over the long term.

EECA

The project was supported through the Innovation Fund, which EECA ran in 2007 and 2008 to support the uptake of solar and heat pump water heating, including commercial-sized solar water heating installations that could be replicated by other businesses.

EECA provided \$70,000 of funding towards SkyCity's project.

EECA's water heating team manager Nathan Ross said, "Given the high visitor numbers to SkyCity, the public profile of this project was seen as a great way to showcase solar water heating. More businesses could take advantage of the technology and, as SkyCity will demonstrate, cut costs and enhance their brand."

How it works

The installation comprises 22 full-sized solar collectors, covering an area of 58 square metres. Sun-heated water is pumped from the collectors on the roof down 11 floors to a heat exchanger in the parking level below the hotel where the heat is transferred into the cold water entering the system.

The 'pre-heated' water then gets an extra boost from gas boilers before it is used to supply all the large kitchens, restaurants and bathrooms on the gaming floor.

The pre-heating means less gas is needed to get it to the required 65°C, thereby cutting costs and greenhouse gas emissions. Around \$17,000 a year in gas bills is expected to be saved, from this and some other measures to reduce pool heating costs.

The project designer was Ian Sumner of Energy Conscious Design, with conceptualisation and feasibility studies by Adrian Kerr of Project Solar, who modelled the design. A feature of the project has been the use of Energy Conscious Design's unique web-based 'Solar Monitor', which offers a real-time monitoring, animation and reporting tool.

Jon Woodbridge-Buys, SkyCity's energy and environment engineer and the project's manager, says the pre-heating design was the most efficient option for SkyCity's particular use patterns.

"The hot water demand profile of the large kitchens in the hotel and casino is a very good match for the solar supply, and we did not require large storage tanks for hot water with EcoSolar's innovative design. It is an elegantly simple design."

"Given the high visitor numbers to SkyCity, the public profile of the project was seen as a great way to showcase solar water heating."



SkyCity

Using hot water more efficiently saves money in several areas for SkyCity: the cost of water (metered in Auckland), the cost of pumping the water, gas heating costs and reducing waste water.

But the business case for SkyCity is about more than just direct savings, according to Matt Howells, SkyCity's facilities manager: "A project like this has to make business sense. Part of that business case is the direct cost savings we can make, and given the amount of hot water the building uses, the investment in efficiency will pay itself off quickly.

"The other part of the business case is about the SkyCity brand. We are committed to environmental sustainability and that means putting our money where our mouth is."

Simon Jamieson, the general manager of SkyCity Group Hotels, says the project is part of SkyCity's overall sustainability strategy, which includes energy efficient lighting and a mini wind turbine on the Tower. (See box: Blue Sky thinking.)

"This solar water heating installation will be seen by up to three-quarters of a million Sky Tower visitors every year. We hope that will inspire them to think about changes they can make in their own lives that will reduce energy use for the good of the planet."

Next steps

SkyCity is not resting on its laurels. Next steps include energy efficiency improvements to air conditioning and ventilation, water usage and waste disposal. In the future, it even hopes to explore the possibilities of using solar energy in both concentrated heat and photovoltaic technologies.

SkyCity's solar hot water system is continuously monitored and can be viewed in real time on the EcoSolar website and the SkyCity website:

www.SkyCityauckland.co.nz/solar ■

Blue Sky thinking

Smart energy moves do more than save money for SkyCity.

- Replacing hot halogen lighting with warm vertical compact fluorescents has reduced mugginess in hotel corridors, and reduced the air conditioning load considerably.
- Educating hotel housekeepers and cleaners on better water use has reduced wastage by 12.5% at the Grand Hotel.
- Efficient showerheads have been put to the test to find out which ones will continue to provide guests with a great shower while reducing hot water wastage.
- Simply using the swimming pool cover effectively is expected to save more than \$8,000 in gas costs a year.
- Efficient carpark lighting makes a huge difference when you operate parking facility for 2,825 cars. SkyCity uses Kiwi-designed 'batwing' lighting reflectors to improve the effectiveness of the efficient fluorescent carpark lighting, meaning fewer lights are needed, while dark shadows are eliminated.





Flight plan

Miranda James reports on a world-first stocktake of flight operators' fuel efficiency.

Flying tourists around New Zealand's beauty spots must be one of the best jobs in the world – but it comes with a hefty fuel bill.

Whether running helicopters or fixed-wing planes, tourist flight operators typically spend at least half their operating budget on fuel. This makes them particularly susceptible (as are all transport operators) to volatile fuel prices.

To help operators reduce fuel costs the Tourism Industry Association (TIA), in partnership with EECA, has commissioned a stocktake report on flight operators' fuel efficiency.

“To the best of our knowledge, this stocktake is the first of its kind in the world,” says report author Helen Osmaston of Francis Aviation Ltd. “Fuel efficiency analysis is addressed at airline level, but not for general aviation.”

The study, released in March, outlines a range of ways to improve efficiency. For example, retrofitting modern fuel management instrumentation to fuel-injected piston engines, which has the potential to save 10-15% of fuel. Many of the other recommendations cost little or nothing. Having a system to measure and monitor fuel use was shown to be key. One company that took part in the study, Queenstown-based Real Journeys, had started recording fuel consumption manually and posting results on a noticeboard. This alone brought fuel savings of 2% or 4,000 litres, saving the company \$6,800 annually.

Training is another focus. The research showed that new pilots often had little understanding of fuel efficiency. TIA now aims to work with the flight training industry to find ways to build skills.

Other recommendations included building a company culture of fuel efficiency, ensuring aircraft are regularly washed and polished (this alone saves 2% of fuel).



Air Safaris, which runs alpine sight-seeing flights through Aoraki Mount Cook and Westland Tai Poutini National Parks, took part in the stocktake. *Image courtesy of Air Safaris.*

The research is the latest initiative from the Tourism Energy Efficiency Programme – a long-running partnership between EECA and TIA.

“Aviation is a very visible part of our industry and a sector with high energy use. We wanted to see what could be done, without compromising safety or the visitor experience, to improve fuel efficiency and reduce costs,” says Tim Cossar, TIA chief executive.

Seven tourist flight operators took part in the research, with a total of 48 aircraft. They include fixed-wing planes, helicopters, float planes and ski planes from around the country.

Glenorchy Air took part because they believe in “putting their money where their mouth is,” says Robert Rutherford, who owns the company with wife Janet. The company has three fixed-wing planes, and has worked on minimising its environmental impact for years, including training pilots on fuel efficiency and buying a

technologically advanced plane with a small carbon footprint. “The stocktake was a natural extension of that. We wanted to see if there was anything more we could do to reduce our carbon footprint and save fuel and money.”

Training is another focus. The research showed that new pilots often had little understanding of fuel efficiency.

Mr Cossar stressed that some operators were already very active. Because there’s been a dearth of research up until now, the study will be a good first start, he says. “We’ll be looking at how we can engage with the training industry to promote awareness. And we hope that wider uptake of fuel measuring and monitoring will provide a baseline to help analyse improvement over time – which will help to build industry knowledge.” ■

NZ talks energy efficiency on the world stage

When the International Energy Agency (IEA) hosted an energy efficiency week earlier this year, EECA's manager of monitoring and research Robert Tromop was there.

"There are a number of areas where advances are being made internationally and real leadership is being shown – in fields that coincide with New Zealand's priorities," says Tromop. "We aim to contribute and bring back learnings that will inform our own programmes and help businesses and households here in New Zealand."

The importance of energy efficiency in the international arena seems to be growing. A recent 'straw poll' of IEA government ministers indicated that sustainable development has overtaken security of oil supply as the most critical issue.

This has helped make energy efficiency a massive area of activity for the IEA, with four sub-groups devoted to it.

One of these is the International Energy Efficiency and Conservation Partnership (IEECP) which met during the week and is spearheading a number of projects, including a sustainable building network. This will coordinate solutions for near-zero energy buildings, intelligent architecture and policy options for energy efficient retrofits.

Two other key partnership projects are a Super Efficient Equipment and Appliances Deployment initiative (working with industry to accelerate the take-up of advanced efficiency in appliances) and an energy management network, working to build capacity of energy managers in business. EECA aims to get involved in these three programmes.

Promoting behaviour change in energy users has long been an EECA focus. The EU is leading a programme called Changing Behaviour to identify how consumer behaviours affect energy efficiency decisions. An energy cultures project run by Otago University and funded by the Foundation for Research, Science and Technology, and EECA's own research into consumer values and behaviours, are useful inputs to this field. As the only non-EU country involved, it's an area where New Zealand can contribute to the international knowledge base.

New Zealand is also helping improve governance of energy efficiency activities. EECA has already helped trial an IEA international survey of 500 government, industry and NGO contacts as part of a project to develop guidance on smarter governance for energy efficiency.

R&D innovation is an area of ongoing interest. EECA's own research activities are governed by a 'Stagegate' process – a best practice multi-stakeholder approach where people from different disciplines help set research priorities and ensure quality.

"Internationally there's little understanding of R&D governance – it's an area the IEA intends working on. A number of countries operate roadmaps or research platforms but these often have poorly defined innovation objectives that struggle to clearly identify how they will develop real and relevant wealth for the country," says Tromop.

"There are obviously substantial differences between New Zealand and other countries when it comes to energy use and policy. But despite being a small player in terms of IEA member countries, there's a great deal we can contribute – and it grows our own expertise." ■

A sustainable building network project will coordinate solutions for near-zero energy buildings, intelligent architecture and energy efficient retrofits.





Cleaning up with wood energy

South Island laundry company McCallum Group has cut its fuel costs by nearly two-thirds with the switch to clean-burning wood energy – and the savings are set to mount.



McCallum Group provides laundry, dry-cleaning and monogramming services across the lower South Island. Part and parcel of the business is high energy bills – at times its LPG and light fuel oil costs were 16% of operating costs.

Last year, with support from EECA, McCallum Group switched to wood energy for its heat requirements, slashing fuel costs and reducing carbon emissions at the same time.

“There were two main drivers for the change,” explains managing director Wayne McCallum. “Firstly, we needed better certainty about our ongoing fuel costs, to enable us to price long-term contracts. And capacity was the other major issue – our two sites were already operating at 120% and reaching the end of their economic life. So, as we had to relocate, it was an ideal time to review our energy options.”

The company set about investigating different fuels. Management visited sites burning wood waste and lignite, and the company also trialled waste oil. Wood came up trumps as the preferred energy option for their boilers. There were significant environmental benefits – wood fuel has a very low carbon footprint compared to fossil fuels, and lower particulate emissions than many other options. It was also cost-effective, as McCallum Group was able to secure a five-year supply contract at a fixed price (and with a five-year right of renewal). On this basis, a wood-chip-fired boiler would reduce their annual fuel bill by nearly two-thirds.

Commissioning the boiler took a bit of time.

“However it was no more than you would expect from any equipment installation of this size,” says Mr McCallum. Much of the ‘new’ boiler is actually recycled, both to keep the capital cost down and because buying second hand made it easier to get items as and when they were required.

McCallum Group made the most of the clean slate offered by the relocation, to install other energy-saving measures. Waste water from the washing process is now recycled through the emissions scrubber, recovering heat and saving more energy.

There were significant environmental benefits – wood fuel has a very low carbon footprint compared to fossil fuels, and lower particulate emissions than many other options.

“It’s lifting the water we get off the street at about 15°C to 40°C at no cost,” says Mr McCallum.

“We’ll eventually get it to 60°C. Other businesses that don’t have a use for that hot water could use the energy to dry out the wood chips, but the chip we get is already relatively dry.”

McCallum Group is very happy with the results. “We’ve got more physical room and more capacity. The long-term supply contract has given us assurance about future thermal energy costs, as well as significant isolation from the volatile fossil fuel market. And the savings will only increase as the new boiler reaches capacity.”

The improved environmental record from using a clean-burning, virtually carbon neutral fuel are also likely to appeal to customers, he says – particularly environmentally-aware tourism operators. ■

Boiling point

Many businesses could be making significant savings with simple adjustments to their process heat systems, according to two EECA pilot studies, as Tamara Lee explains.

While boilers tend to toil away unseen, they are at the heart of most industrial and commercial businesses' process heat systems, providing heat and energy for a wide range of manufacturing processes.

Process heat is a significant area of energy use: New Zealand's industrial and commercial businesses use around 112 PJ each year to generate it – nearly twice that used annually by the entire residential consumer sector.

Recent pilot studies indicate, however, that many boilers and wider process heat systems are wasting thousands of dollars in running costs, which generally could be easily avoided.

“From the work that we've done with businesses over the years we had estimated that most process heat users could probably improve the efficiency of their systems by 5% to 20%,” says EECA business manager Murray Bell.

“To look more closely at specific opportunities, we decided to run some pilot projects.”

Cutting fuel costs through boiler combusting tuning

EECA's pilot study on boiler fuel combustion tuning looked at nine boilers of different sizes in a diverse range of businesses, including an art gallery, a laundry business, a vegetable processing factory and a large wood processor. In seven of the nine cases, the boiler was found to be operating outside optimal fuel combustion efficiency levels.

For the four smaller boilers looked at, a \$690 tuning resulted in fuel savings in every case, ranging from \$1,400 to \$17,500 a year. For the five larger boilers, one was found to be operating optimally already, but tuning of the other four – at a cost of between \$1,000 and \$3,000 – resulted in savings ranging from \$3,000 to \$120,000 a year.

“While you don't get the same percentage improvement in bigger businesses, because they generally have good maintenance systems in place, there are still some pretty significant dollar savings to be made,” says Kelly Williams, operations engineer at RCR Energy Service, who performed three of the boiler tune-ups in the pilot.

“For smaller businesses, the potential savings are generally a much larger proportion of their operating costs, so it's something they should really be looking at.”

The pilot found that operating at maximum combustion efficiency saves fuel by reducing the amount of excess air that is heated by the fuel and passes directly out of the chimney. It also reduces build-up of soot deposits on heat transfer surfaces, which allows better transfer of heat.

“Obviously if your boiler's old and inefficient, tuning won't give you the kind of savings you'd get by simply replacing it. But for many businesses, there are some good efficiency and savings opportunities to be gained from boiler fuel combustion tuning,” says Williams.





Uncovering process improvement and fuel savings opportunities in process heat systems

Williams is also quick to point out that the boiler is just one part of the wider process heat system. “To get industrial plant operating at maximum efficiency, it’s really important to take a holistic view of the system. The heat plant and the production process are actually two halves of one system.”

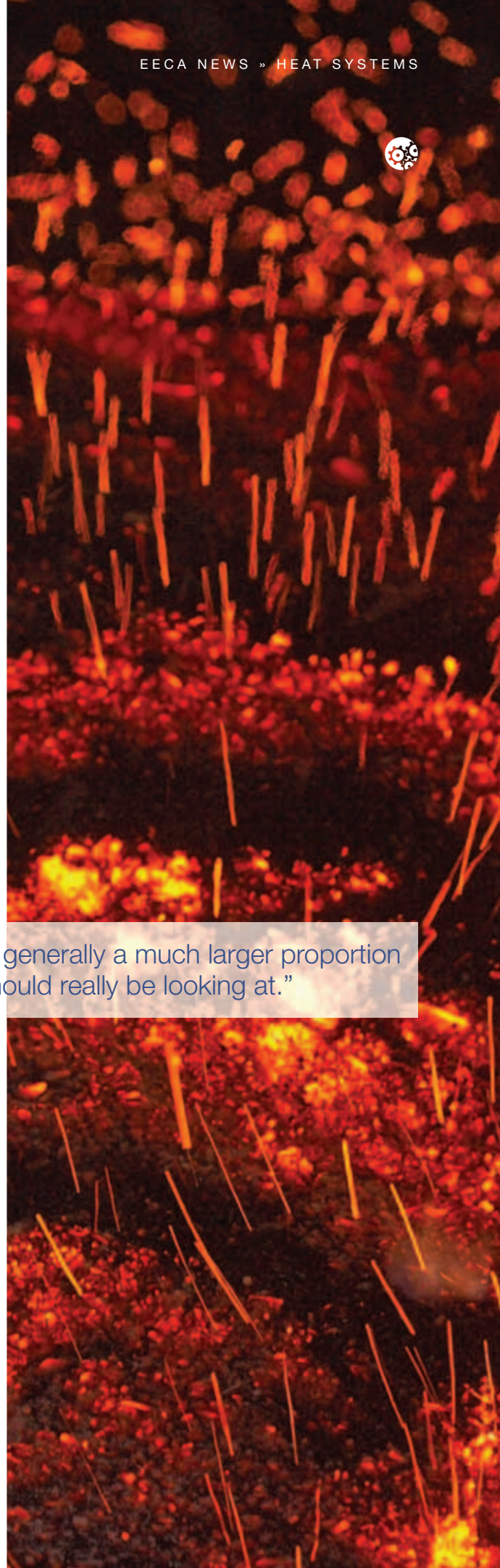
In another pilot study, EECA helped fund thermal audits of the process heat systems in four large businesses – Canterbury Woolscourers, Dongwha Patinna Mataura, Mainland Products Christchurch and Tatua Dairy Products. The audits identified significant savings opportunities for all – many of which have a payback period of less than a year.

“For smaller businesses, the potential savings are generally a much larger proportion of their operating costs, so it’s something they should really be looking at.”

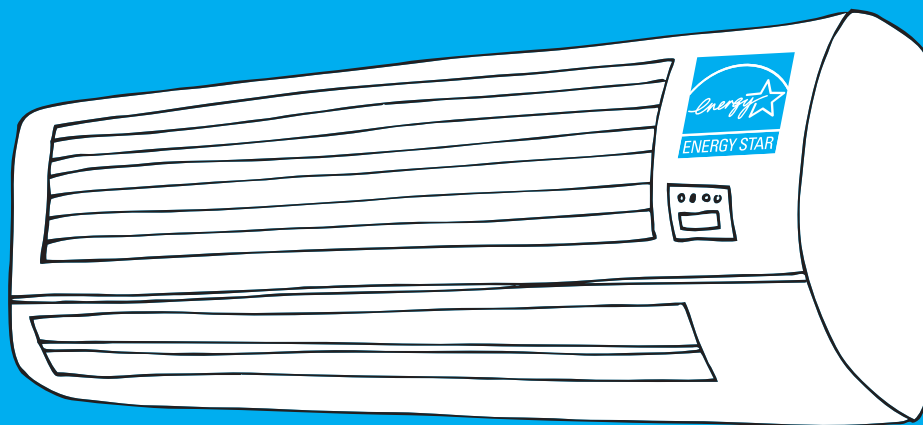
The Canterbury Woolscourers audit, which cost \$14,900, identified \$174,000 in energy savings opportunities with a payback period of less than 12 months. It also found a further \$76,000 of potential savings with a payback period of between one and three years.

“It’s been really worthwhile getting an outsider’s perspective on things and I’d certainly recommend it to other businesses,” Canterbury Woolscourers general manager Tony Cunningham said of the thermal audit.

“We’ve got good, skilled staff in-house working on our systems every day, but getting a different viewpoint and testing the boundaries has turned up some savings in our process heat system that we might otherwise not have found. We’ve now got an action plan and timelines in place to get these energy-saving measures in place.” ■



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