



COOLING WATER SYSTEM UPGRADE PAYS OFF

It didn't take long to convince Viscount Plastics New Zealand that it should upgrade the cooling water system at its Auckland factory to make it more energy-efficient – and cheaper to run.

And it wasn't just because the company was eligible for a grant from Energy Efficiency and Conservation Authority's (EECA) Energy Intensive Business (EIB) grants programme to help pay for the upgrade. Viscount Plastics was so enthusiastic about the proposal – the main recommendation in an EECA-subsidised energy audit – that it not only went ahead with upgrading the cooling water system at its Auckland factory, it happily paid the full cost of doing the same thing at its smaller Christchurch factory.

"We did both factories at the same time," explains the company's commercial manager, Tony Fox. "By the time we'd gone through all the options with EECA we were so convinced of the outcome that we put it to our shareholders in Australia and got approval to go ahead with upgrading both systems."

The cooling water upgrade at the Auckland factory uses technology which is common in the meat and dairy industries, but which had not previously been used in a plastics factory. For that reason, the cost of the upgrade was partly subsidised by a \$48,000 grant from EECA's Energy Intensive Business programme. Work began on the \$120,000 project in May 2007 and was completed in October 2007.

It's turned out to be a good investment. A monitoring report published in February 2008 suggests that the upgrade will cut electricity use at the factory by at least 324,848 kWh a year – an annual saving of about \$38,000.



The grant did not cover similar upgrading work at Viscount Plastics' smaller Christchurch factory. However, the company went ahead with it anyway, despite the \$38,000 price tag. It's expected to save another \$18,500 a year, paying for itself in less than two years.

According to Mr Fox, the cooling water system upgrades are just a first step towards Viscount Plastics New Zealand becoming more energy efficient.

"It's a concept we have embraced. Once we'd had the energy audit done we had a better idea of where we were using electricity and where we could save it. Now we're trying to drill it down to the next level."

About Viscount Plastics New Zealand

Viscount Plastics New Zealand is a member of the LINPAC Group, an international plastics-based packaging company. It has two factories, one in Auckland and a smaller one in Christchurch.

The Auckland factory operates 14 injection moulding machines ranging in capacity from 125 tonnes to 1,400 tonnes. These are used to produce a range of products, including plastic packing containers such as stackable bread crates, and rigid containers such as paint pails.

The business case

Like most large companies, Viscount Plastics New Zealand is keen to reduce its energy use. In 2006, it commissioned an energy audit at its Auckland factory to get a better idea of how to do this. The audit was partly paid for by EECA's Emprove programme, which provides grants of up to \$50,000 towards the cost of an energy audit for companies with energy bills of more than \$100,000 a year.

"We wanted to find out where our energy was going, and where we could save it," says Mr Fox. "Like everyone, we don't want to be buying too much power, particularly as the price of it keeps going up."

The audit recommended a number of low- and no-cost changes which the company implemented almost immediately. They ranged from actions as simple as fixing leaking shower heads, to reducing the unnecessary use of artificial lighting during the day, and installing sensor lights in some areas of the factory. The result was an almost 10% reduction in energy use.

But the audit's main recommendation was more substantial. It suggested upgrading the factory's cooling water system to make it more energy efficient. According to the audit, the upgrade had the potential to cut energy use at the factory by as much as 22%.

The cooling water system upgrade

Viscount Plastics' Auckland factory uses chilled and cooled water to cool its injection moulding machines. It also uses the water to cool plastic products during production.

The cooled water system operates by pumping cooled water to the injection moulding machines, then extracting the heat via cooling towers before using it again. The chilled water system operates in the same way, except that the water first passes through one of three water chiller sets before being pumped to the injection moulding machines.

Previously the system operated at maximum capacity all the time, which meant that during periods of low production the company was paying to chill and cool water it didn't need. The cooling towers also operated at maximum level all year round, rather than varying the level of cooling depending on the outdoor temperature.

The upgrade involved three separate actions, all intended to make sure that the factory produces only as much chilled and cooled water as it needs, at the right temperature. They were:

- Installing variable speed drives on the pumps which supply the chilled and cooled water to the moulding machines.
- Installing variable speed drives on the cooling towers.
- Installing a programme logic controller onto the factory's two chiller plants.

Monitoring carried out for EECA found that the upgrade is likely to reduce energy use at the factory by at least 324,848 kWh a year – a saving of about \$38,000. The monitoring report compared energy use during November 2007 (immediately after the upgrade) with energy use during the May 2007 (before the upgrade). Both months had similar production levels.

It found that the cooling water system used 43,135 kWh less during November than during May, a reduction of 22%. That equates to an annual saving of 324,848 kWh a year.

Month	May 2007	Nov 2007
Total production (tonnes)	422	419
Total production hours	6795	7555
Cooling water system electricity demand	190,101 kWh	146,966 kWh
Specific electricity demand (kWh/kg)	1.523	1.468

Where do the savings come from?

According to Ivan Fraser, the consulting engineer who carried out the monitoring, the biggest saving comes from the variable speed drives (VSDs) on the pumps which supply the chilled and cooled water to the moulding machines. Before the upgrade, the pumps were operating at maximum pressure all the time, and any excess water had to be spilled off. The VSDs mean that the system now only pumps as much water as it needs at any one time. That saves energy by reducing the amount of water that has to be chilled and cooled.

The next biggest saving comes from the VSDs on the cooling towers. This means the factory can now vary the level of cooling depending on the outdoor temperature, rather than cooling at the same level winter and summer. Previously the company was effectively over-cooling its water during winter, and wasting energy as a result.

A much smaller saving comes from the programme logic controller on the factory's two chiller plants. This means that rather than operating both plants all the time, as the factory used to do, the second plant switches on only when it is needed.

According to Mr Fraser, similar systems have operated for many years at large dairy and meat processing factories. However this is the first time the technology has been used at a plastics factory. He says a similar upgrade could be carried out at other plastics factories.

"It would probably work best for larger plants with a mix of products."

Energy Intensive Businesses – Project Grants

EECA has grants available of up to 40% of the capital cost of a project, with a maximum of \$100,000 for each grant. Projects that implement new or under utilised technologies to New Zealand are encouraged to apply.

The implemented technologies should:

- be capable of reducing the energy intensity of an organisation's operation
- have the potential to be applied to a majority of businesses across their industry sector
- be commercially available and offer an acceptable payback period.

Businesses who receive a grant must be willing for their project to be used as a case study, so others can learn from their experiences. Other businesses can look to you as an example of good energy management making you a leader in your field.

Contact: Phone: 0800 358 676
email: eib@eeeca.govt.nz

Other energy grants

Emprove

EECA offers the following services and funding for businesses energy efficiency projects:

Energy Achiever

- Hour-long session with EECA Emprove Account Manager to scope current energy usage
- Free for businesses spending more than \$500,000 a year on energy.

Energy Audit

- Comprehensive energy audit carried out by an independent consultant
- Funding available through Emprove programme towards the cost of an energy audit for businesses with energy bills of more than \$100,000 a year.

Contact: Phone: 0800 358 676
email: emprove@eeeca.govt.nz

Supporting the use of wood residue

The Wood Energy Grant Scheme offers help, by way of funding and information, to businesses interested in using wood residue as an energy source.

EECA can provide:

1. Funding for demonstration projects
2. Funding for feasibility studies that review the use of wood residue as a fuel
3. Relevant information to sawmills, forestry owners and the general public on the use of wood residues via the Bioenergy Knowledge Centre (www.bioenergy-gateway.org.nz).

Funding available for business grants

Business grants for capital/demonstration projects may be up to 40% of the capital cost of the project, with a minimum of \$10,000 and maximum of \$200,000.

Funding is available for projects involving technologies that:

- Have the potential for widespread industry adoption
- Have an acceptable payback period or ROI.

Applicants must be willing to have their project monitored by a third party and allow the results to be published to help promote energy efficiency.

Funding available for feasibility studies

Grants for feasibility studies are available up to a maximum of 75% of the feasibility study costs and the applicant must be willing to have the results of the studies publicised as a case study.

Funding is available for feasibility studies involving technologies that:

- Have the potential for widespread industry adoption
- Are capable of saving energy or have potential for increased use of renewable energy.

Contact: Phone: (09) 374 3803
email: woodenergy@eeeca.govt.nz

Energy Efficiency and Conservation Authority contact details:

EECA Head Office

Phone (04) 470 2200
PO Box 388, Wellington 6140
Level 1, EECA House,
44 The Terrace, Wellington 6011

EECA Auckland

Phone (09) 377 5328
PO Box 37444, Parnell,
Auckland 1151
Level 4, Guildford House,
2 Emily Place, Auckland 1010

EECA Christchurch

Phone (03) 353 9280
PO Box 8562, Riccarton,
Christchurch 8440
Level 1, Sinclair Knight Merz House
321 Manchester Street,
Christchurch 8013

www.eecabusiness.govt.nz