



THE GOOD OIL ON ENERGY SAVINGS

It's literally been a case of 'waste not, want not' for manufacturer Bakels Edible Oils – as they take an environmentally-responsible approach to energy saving.

The Mt Maunganui-based facility has installed a dual-fuel boiler that has reduced natural gas usage by utilising waste products from their factory.

By-products of the company's manufacturing process include waste vegetable oils and low-grade tallow, which is now being used to run the steam-generating boiler. During the first half of 2008, the boiler has been running on tallow for about 25% of its operating time.

"We're burning all our waste vegetable oils and tallows to save on natural gas," explains Bakels' operations manager Brent Warner.

"Previously we would drum off the tallow and sell it overseas. Now we've decided to utilise it ourselves and reduce our natural gas usage."

As it would save energy, the project was eligible for a 40% grant towards the capital cost as part of Energy Efficiency and Conservation Authority's (EECA) Energy Intensive Business (EIB) grants programme.

As well as resulting in significant cost savings, the project reflects the company's commitment to environmentally-sound business practice.

About Bakels Edible Oils

Bakels Edible Oils (NZ) Ltd is one of New Zealand's largest specialist manufacturers of edible fats and oils.

Established 17 years ago, it currently employs more than 100 people in the Tauranga region.



Bakels' markets span various sectors including retail, food service, industrial and dairy-based foods. As well as supplying food service outlets such as fish and chip shops, restaurants and cafes, they also supply Fonterra for their supermarket butter blends, and frying compounds for use in McDonalds restaurants.

The business case

Energy represents 2.8% of total business costs at Bakels, and the primary energy source is natural gas. Before the installation of the dual-fuel boiler, the company was spending approximately \$1 million on natural gas per year.

The steam generated by the factory's boiler is used to raise vacuum, as well as heating the bulk products contained in the silos.

"A lot of our bulk raw materials set solid, so we need to keep those silos warm so we can transfer the product appropriately from silo to silo."

The steam generated also provides heating for the plant's cleaning systems, including various clean-in-place chemicals.

According to Brent Warner, the rising cost of energy was the primary reason the company decided to look at alternatives. Another driver was their corporate commitment to environmental issues.

Bakels has already achieved bronze status with Enviro-Mark NZ, an environmental initiative that is administered by Landcare Research in New Zealand. They are now aiming to achieve platinum level status.

The combustion of natural oils and fats – whether animal or vegetable – produces significantly lower particulate and acid gas emissions when compared to fossil fuels. (All types of oils and fats are made up of the same types of chemical compounds – which means their chemistry of combustion, and thus emissions, are identical.)

Around the world, tallow and rendered animal fats have been used as a replacement for fossil fuels for some time, mainly in the rendering industry. Over the past few years it has become increasingly attractive as a renewable, carbon neutral biofuel.

The dual fuel boiler

In 2006, Bakels made the decision to replace their three existing 4,000 lb boilers with one large 12,000 lb boiler capable of running on both natural gas and low-grade tallow.

At the time of making their application to EECA, the new boiler had been installed and successfully operating on natural gas for about six months.

The second part of the project was to install and commission the tallow delivery system, so the burner could operate on dual fuel.

"We waited six months because we wanted to ensure the new boiler was settled in and operating nicely on gas," says Brent Warner.

"Given that our facility runs 24 hours a day, 7 days a week; we needed extensive pre-commissioning work prior to the change-over and commissioning and tuning of the burners."

The boiler was supplied and installed by Christchurch-based firm Scott's Engineering, which has installed a number of other dual-fuel boilers operating on tallow.

Although the use of tallow as an energy source is relatively rare in New Zealand, Brent Warner says similar waste-generated systems are commonly used in Eastern Europe and Asia.

Savings and other benefits

There was a capital cost of \$55,445 to install the tallow delivery system, including all ancillary equipment and commissioning. Taking into account the 40% EECA grant of \$19,409; the project had a net cost of approximately \$36,000.

Initially, it was projected the use of tallow fuel would deliver savings of up to \$300,000 per annum. However due to the worldwide increase in vegetable oil and tallow prices, the initial savings have been somewhat less than originally projected.

But as Brent Warner explains, it is an investment for the long term.

"While it's definitely achieving savings for us, at the end of the day it's not all about dollars."

"After all, we're utilising one of our waste streams to negate the need to burn natural gas."

Capital Investment	\$55,445
EECA Subsidy (40%)	\$19,409
Previous Energy Usage – Natural Gas	87,000GJ
Previous Annual Cost – Natural Gas	\$1,000,000
Estimated Annual Savings (long-term)	\$300,000
Annual carbon dioxide emissions reductions	1,378 tonnes

In future, Bakels' supply of tallow may be further augmented by plans to 'recycle' expended cooking oil from end users such as fish and chip shops.

"We're looking at various venues for sourcing expended oil and using it again at our facility," says Brent Warner.

"These quantities would boost our own internal source of low-grade tallow and allow us to more fully utilise the capacity of the boiler."

In other energy-saving moves, Bakels has also installed energy saving lightbulbs throughout the plant.

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.

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