

✓ Key features

- 50 kW wood pellet-fired boiler
- Feeds 40 radiators serving bedrooms and communal rooms
- Also backs-up the solar powered hot water system

✓ Key benefits

- Fully automated, clean, virtually hands-free operation
- Estimated running cost about one third of equivalent electrical system

Wood pellets make warm welcome economical

When accommodation is key to your business, you have to be sure the warmth of your welcome is matched by the warmth of your rooms.

That can get expensive, given the guests enjoying your hospitality aren't the ones paying the heating bills. It's even more of a problem when your facilities are older and you're working to keep your prices down.

For Titoki Healing Centre, the solution arrives regularly in three tonne loads. They've commissioned a totally automated wood pellet-fired system that is proving considerably cheaper than electricity and every bit as convenient to operate.

The background

The Titoki Healing Centre is a residential facility offering Christian healing and retreat services. It's been running for over 30 years in an idyllic 10-acre rural setting just south of Whakatane in the Bay of Plenty. It hosts conferences and also lets out some facilities as motels for holidaying families.

"We're here as a safe place for people who are on their own or who need time out for one reason or another. We reckon the angels

surround us – we've never had a burglary or a problem," says long-term staffer and maintenance manager Peter Gerritsen.

The main building in the complex is an old homestead with three lounges, ten double bedrooms, dining rooms and a commercial-scale kitchen. Other buildings include a cottage which is available as a motel unit, four villas and a chapel. All up, the Centre can accommodate 30 guests and houses six staff.

Given the mission driving the business, guest charges are generally heavily subsidised – often below cost. "We want to be sure that everybody who needs to be here, can be," observes Peter.

Most staff are volunteers. The full timers work 60 to 70 hours a week for six weeks, then close the Centre down for a week to recuperate.

This core is supported by a large group of casual volunteers. "When they help, they also eat here."



“If you’ve got everything going for 12 people, it’s a lot better economically to look after 30”

The challenges

Like any hospitality business, the Centre’s main business challenge is maintaining and increasing guest numbers. As Peter puts it, “If you’ve got everything going for 12 people, it’s a lot better economically to look after 30”.

While it has a ‘spiritual edge’ in terms of setting and atmosphere, the Centre was very aware it still had to cater for guests’ physical comfort and that on a practical level its aging heating and hot water systems simply weren’t keeping up.

With income constrained, managers had to look especially carefully at the alternatives. For support, they turned to the local Eastern Bay Energy Trust which helped them review the position.

Located rurally and away from reticulated supply, gas wasn’t an option.

Heat pumps were ruled out on two grounds. The Centre’s energy advisors felt the structures were too old and heat-porous for them to be effective, even once basic in-ceiling and under-floor insulation was installed. There was also concern that heat pumps might actually increase overall fuel bills if people used them to cool their rooms in the hot Bay of Plenty summers

instead of simply opening the windows or escaping to the shady gardens.

Standard wood burners, while potentially economical, would be too labour-intensive, especially given that many of the volunteers are middle-aged and older. They couldn’t be expected to lug heavy loads, chop wood or be up with the bellbirds to light fires.

The Centre needed to move on from the ‘old days’ of the 1970s when the original wood-fired Marshall boiler had to be fired up at the crack of dawn to ensure there would be hot water for the kitchen.

It needed a system that would be ‘hands free’ – one that would turn itself on and off as necessary and keep itself refuelled.

Titoki’s wood pellet solution

The solution is a 50 kW ‘Woodpecker’ wood pellet-fired boiler. It serves 40 new radiators around the main building, all fitted with thermostatic radiator valves.

The system is totally automated. “It’s programmed to start up once the external temperature goes under 16°C. So this morning, because it was 20°C, it wasn’t needed.”

The Bay of Plenty can be balmy in spring, summer and autumn, but winter mornings inland at Titoki can be brisk.

“It can get down to minus six Celsius,” says Peter, “and this system handles that.”

The boiler also manages itself, modulating between 30% and 100% of load by sensing the required heat demand which helps keep it very economical to operate.

The Woodpecker has another function – backing up the Centre’s solar-powered hot water supply. A programmable logic controller (PLC) is pre-set to switch the boiler on to supplement the solar panels’ contribution on the occasional days when there is not enough sunshine.



Wood pellet storage hopper.

External bulk storage

The Woodpecker’s boiler is fed from a three-tonne storage hopper outside. A flexible auger feeds the pellets into a smaller hopper located inside the boiler room which in turn feeds the boiler.

The external hopper has been an important part of creating a hands-free set-up. It means that instead of having to ask his volunteers to help to lug 20 kg bags around all the time, Peter just keeps an eye on the bulk hopper. Then, as required, he orders up another truckload to be tipped in.

About the only labour required is cleaning out the ash.

“It seems to create very little,” comments Peter. “I clean out the ash every three to four weeks. It’s only about half a banana box full, which I empty under the citrus trees where it makes itself very useful.”

The economics

Wood pellets were a very economical choice for the Centre.

“Installing the boiler cost around \$60,000. Another \$20,000 was required for the bulk storage and more was spent on upgrading the plumbing system,” explains project installer Iain Charity of Rotorua-based PL Gas and Solar Ltd. “That compared with a cost of around \$90,000 for a heat pump system, which didn’t include any plumbing upgrade.”

Running costs are around two-thirds cheaper – about \$4,400 annually compared to the \$11,400 per year it’s estimated an electrical system would have cost (based on the Centre’s current cost of electricity of about 17 c/kWh).

Pellets are supplied by Nature’s Flame in Rotorua at around \$350 per tonne delivered cost. At that price, the energy cost for the heating is coming in at 7 to 8 c/kWh. That’s comparable with what might be expected from heat pumps, but doesn’t factor in the boiler’s contribution to hot water, or the annual savings from centralised control and minimised summer running.

“I love the system” says Peter Gerritsen. “And it works a treat to keep the house warm and welcoming. I especially love the fact that it is fully automatic and user-friendly and if there is a problem, Iain can change the settings from his laptop wherever he is.”



Small inside hopper.



50 kW "Woodpecker" wood pellet-fired boiler.

"I love the system" says Peter Gerritsen. "And it works a treat to keep the house warm and welcoming. I especially love the fact that it is fully automatic and user-friendly and if there is a problem, Iain can change the settings from his laptop wherever he is."



EECA enables organisations to increase their domestic and international competitiveness by adopting energy efficiency and renewable energy practices.

We work with businesses to identify the opportunities for energy management that are available to them and help them develop energy management action plans to make the most of these opportunities.

Good energy management has many benefits for businesses, including lower costs, increased productivity, reduced greenhouse gas emissions and a positive effect on the brand.

We have a particular interest in:

- encouraging new or under-used technology that can make processes more efficient
- projects that reduce greenhouse gas emissions, and
- developing the wood fuel industry.

For more information contact
The Energy Efficiency and

 Conservation Authority:

EECA HEAD OFFICE:

PO Box 388, Wellington, (04) 470 2200

EECA AUCKLAND:

PO Box 37444, Parnell, Auckland, (09) 377 5328

EECA CHRISTCHURCH:

PO Box 13983, Christchurch, (03) 353 9280

www.eecabusiness.govt.nz

JUNE 2009