



Burning money

Why split firewood and have to store it, when you can buy dry firelogs anytime? Because bought firewood is less than half the price – that’s why, says **Bill Whitley**.

Tempting isn't it? Nice convenient packs of dry firewood, the right size, ready to burn, without the hassles of buying and storing firewood months in advance.

Ready-to-burn firelogs provide good heat, with low emissions. But they are expensive to use – even if you have a modern efficient woodburner. With one of the logs we tested, plugging in an electric heater would be cheaper.

Our test

We took four different types of ready-to-burn firelogs and compared the way they burn to clear, seasoned radiata firewood. We used the same low-emission woodburner for all the firelogs (and for the seasoned radiata).

For each fire we started with a hot ember bed, weighed the same quantity of fuel, and then burned it away completely. We noted how long the fuel burnt for – and, while it was burning, we continuously measured the heat output of the fire, the fire temperature, and the emissions going up the chimney.

Our results

Burn time: The Duncan Wattie Firelogs, Solid Energy HotLogs and the Lighthouse Firelogs tend to burn longer, but with less heat, than regular (radiata) firewood. This longer burn time despite having less heat output may be a desirable feature, because a radiata fire does tend to need reloading quite often.

| Fuel | Running cost (c/kWh) | Fuel price (c/kg) | Emissions (g/kg) | Burn time (minutes) | Average output (kW) | Efficiency (%) |
|-------------------------------|----------------------|-------------------|------------------|---------------------|---------------------|----------------|
| Clear, seasoned pinus radiata | 6 | 19 | 1.3 | 100 | 6.8 | 65 |
| Duncan Wattie Firelog | 15 | 54 | 3.3 | 195 | 5.2 | 75 |
| Solid Energy HotLogs | 15 | 55 | 2.7 | 164 | 5.2 | 73 |
| Solid Energy Ecoheat Bricks | 19 | 65 | 1.7 | 115 | 7.0 | 70 |
| Lighthouse Firelogs | 27 | 105 | 5.8 | 167 | 5.1 | 71 |

The Solid Energy Ecoheat Bricks were closest to the burn time and heat output of radiata firewood.

Emissions: These were lowest with the radiata – which is not surprising, given that modern woodburners are “tuned” to burn this fuel.

All except the Lighthouse Firelogs produced emissions that were higher than the radiata’s but still reasonable (between 2.7g and 3.3g per kg of fuel). These are similar to figures we got for macrocarpa and blue gum in last year’s firewood burning test.

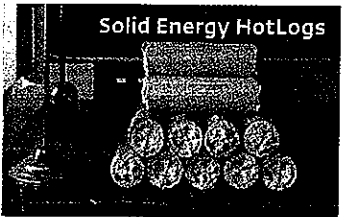
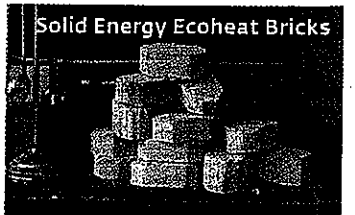
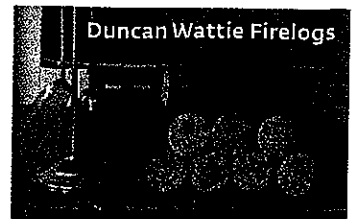
The Lighthouse Firelogs produced 5.8g per kg of fuel, which is a bit on the high side given that these are manufactured products.

Cost: Using radiata in a modern woodburner costs about 6 to 7c/kWh of heat produced. A portable electric heater comes in around 20c/kWh. The Duncan Wattie Firelogs and Solid Energy HotLogs cost around 15c/kWh; and the Solid Energy Ecoheat Bricks cost about 19c/kWh – so using them is a bit cheaper than an electric heater. Burning the Lighthouse Firelogs at 27c/kWh makes little sense.

We say

► Using seasoned radiata firewood in your woodburner is the cheapest way of heating your house (that’s if you can’t get free firewood).

► Compressed firelogs burn well and are convenient – but they are expensive to use other than as a back-up.



Firewood delivered by most merchants is not very consumer friendly. The pieces are often too big to burn efficiently in a modern woodburner. And a loose pile tipped from the back of a truck is hard to handle.

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Clean, green – and cheap

That's the ultimate challenge for heating your home. **Bill Whitley** takes a look at your options and picks those that damage the environment – and your wallet – the least.

How to heat your home? Sometimes circumstances dictate your options. If you've bought a home with a heating system already fitted, you're probably stuck with it until it's replacement time. Or, if you're renting a property, your choice is limited to whatever's fitted (or portable heaters). Even so, some options are better for your health and cheaper to run than others.

Electricity – today's fuel?

Electricity supplies around 70 percent of Kiwis' domestic power needs – and with new generating capacity in the pipeline it's likely to do so for the immediate future.

How cheap? Every home has electricity, and **portable heaters** are cheap to buy – although their running costs are quite high at around 20¢ per kWh. But they're good for that extra temperature boost in specific areas, like bedrooms and work areas. For modern well-insulated homes we recommend **panel** and **oil-column** heaters. For older poorly insulated houses with high ceilings, **radiant heaters** are likely to be more effective – but not in bedrooms or around young children.

To halve the running costs you're paying for portable heaters, you need to spend money on more expensive, permanently installed equipment. Discount night-rates for **night-store** heaters and **underfloor heating** require a separate meter (check with your power company). Underfloor heating can be laid under floating laminate flooring or ceramic tiles, or for a new house embedded in a concrete pad.

Heat pumps are the cheapest to run of all the electric options: they can be retro-fitted into an existing house. But they must be the right capacity for the house and installed well. Unless you have special (3-phase) wiring installed, heat pumps are the only (electrical) way of getting the 10 to 12 kilowatts of heat required to heat an average home. A conventional single-phase power line can't supply enough wattage to do the job.

How clean and green? Electricity in New Zealand is produced from a combination of renewable (wind, hydro and thermal) and non-renewable (gas, coal) sources – so it's only a semi-clean fuel, from a global point of view. But for you in your home, nothing is cleaner. Despite the inexorable rise in the price of electricity, electric heating provides a clean and easy way to heat your home – especially if the house is rented.

Gas – yesterday's fuel?

Perhaps that's a bit harsh, but the days of gas being a no-brainer for home heating are over. Supply for domestic purposes will be available for the foreseeable future, but we have started to import LPG as local supplies dwindle. There is also some talk of the possibility of importing LNG (liquefied natural gas) to be fed into the natural gas pipeline.

How cheap? Reticulated natural gas is still cheaper than electricity for standalone heaters. The running costs for a **flued**

gas heater and **central heating** range between 7 and 17¢ per kWh – slightly more expensive than an electric heat pump. LPG heating appliances (ranging from 15 to 22¢ per kWh) are generally slightly cheaper to run than electric appliances.

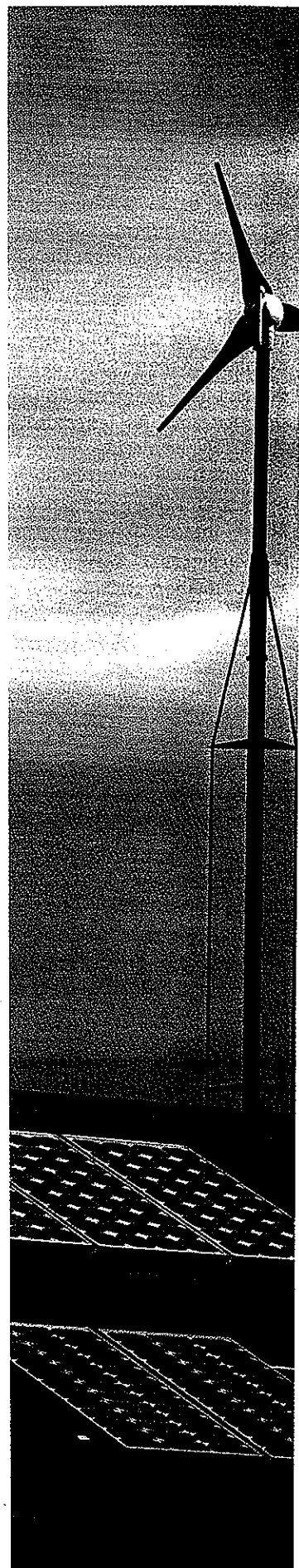
Both LPG and natural gas have a couple of disadvantages that hike their real cost. LPG is supplied in cylinders, which need to be hired. And there's a connection fee for reticulated natural gas. But gas has advantages too. You can get a lot of heat from it – enough to power instant hot water and full-scale central-heating plants.

How clean and green? Gas is clean-burning in terms of pollutants, but it's a fossil fuel – so burning it adds the "greenhouse gas" carbon dioxide to the environment.

Make sure that every gas appliance you buy is flued. Unflued gas heaters (both natural gas and LPG) fill the house with the products of combustion – carbon dioxide, water vapour, and possibly toxic carbon monoxide. This is bad news. You might have a warm home, but it'll be damp. The need for a flue means gas appliances are off the shopping list if you rent.

Diesel – yesterday's (and tomorrow's) fuel?

Thirty-odd years ago oil-fired central heating was the choice of many. The oil crises of the 1970s put paid to that. But times change.



There's often a trade-off between running costs and the capital cost of the heating system.

| Fuel type | | Price (cents) | | | | |
|--------------|-----------------|---------------|---|----|----|-------|
| WOOD PELLETS | Pellet fire | | | | | |
| | Woodburner | | | | | |
| ELECTRICITY | Underfloor | | | | | |
| | Night store | | | | | |
| LPG | Flued heater | | | | | |
| | Room heater | | | | | |
| NATURAL GAS | Central heating | | | | | |
| | Room heater | | | | | |
| DIESEL | Burner | | | | | |
| | | 0 | 5 | 10 | 15 | 20 25 |

How cheap? Despite recent diesel price rises, other energy prices have risen too – so burning diesel in a **central-heating plant**, or in a **woodfire-style burner**, is quite cost effective. It's about the same price for central heating as wood pellets. But you're at the mercy of fluctuating international oil prices. The diesel is stored in a steel tank, which means you have a store of fuel for emergencies.

How clean and green? It's relatively clean now that we have low-sulphur diesel fuel. But it does come from non-sustainable fossil fuel sources and adds to carbon-dioxide emissions. Perhaps we might have affordable bio-diesel available as tomorrow's home-heating fuel.

Wood – yesterday's, today's & tomorrow's fuel?

People have been burning wood since people were people.

How cheap? If you have a supply of free or cheap firewood, then there's no cheaper heating option than a modern **woodburner**. But if you buy firewood, then a **pellet burner** is worth considering. Its running costs are similar to a wood burner's, but without the hassle of large amounts of firewood – and it has the advantages of thermostatic and timer control. (See this issue's separate pellet-burner article "Green heat".)

How clean and green? In this age of sustainability, wood is one of the few truly sustainable home-heating options that is carbon neutral (along with wind and hydro). But to get the most heat, and the least pollutants, it must be burned hot and in a specially designed firebox. The firewood must also be seasoned (dry). Persisting with an old woodburner or an open fire is throwing away heat and creating health-threatening pollution.

Capital costs

There's often a trade-off between running costs and the capital cost of the heating system. It's rather like the eco-friendly and economical car, which costs more to buy than the thirstier model. Fifty dollars or so will get you an oil-column heater that costs you over 20¢ per kWh to run. Spend between \$2000 and \$3000 on a gas heater or a wood burner and the running costs will be about 10¢ per kWh. But spend \$10,000 or so on a central-heating plant, and the running costs will drop only a cent or two – although the capital cost of the central-heating plant could well increase the marketability (and value) of your house.

Open fires

We haven't included the running costs of open fires using wood or coal, because the figures are off the scale – between 27¢ and 55¢ per kWh. Open fires cause massive pollution for the heat they produce. And they don't heat the house very well; in fact they may cool it. The popular Discovery Channel show "Mythbusters" showed that an open fire cooled the area around the fire by 1.5° C, because of the inflow of cold air to sustain the fire's draught.

We say

- ▶ The two cheapest and also environmentally sound home-heating options are firewood in a modern woodburner and wood pellets in a pellet burner.
- ▶ Electric heaters of some kind are the best overall choice for people who rent. Heat pumps are the cheapest-to-run way of electrically heating the whole house.
- ▶ Reticulated natural gas is still a good option for those who have access to it – and as a central-heating fuel it's a bit cheaper than diesel. LPG is more expensive than reticulated gas.
- ▶ The capital cost may make some heating options uneconomic, depending on your circumstances.