

Comfort in winter – solid fuels

Winters past used to be scented by the smell of burning coal and timber. By 2005, though, only 10% of New Zealand homes were heated this way as clean air regulations discouraged the use of these smog-creating fuels.

JULIUS VOGEL, IN HIS VISIONARY 1889 book *Anno Domini 2000; or, Woman's Destiny*, was clear how houses would be heated in the future - 'the use of coal and gas having long since been abandoned in favour of heat and light from electricity, the buildings in London had lost their begrimed appearance, and the old dense fogs had disappeared'.

When Vogel was writing, the solid fuels of wood and coal had been used from earliest settlement, town gas had been in use in Dunedin since 1863, and in 1886, electricity came to Reefton. Even in 2013, these three fuels continue to be used, although their relative importance has changed.

Moving the fire inside

Early settlers moved from cooking over an outdoor fire to draughty, unfinished abodes with leaking roofs and inadequate chimneys and eventually to more comfortable houses with chimneys.

Buildings made of mud, stone or brick could have matching chimneys, while timber-framed construction required a more fire-resistant chimney construction. In these houses, brick, corrugated iron or even wooden chimneys lined with brick or stone provided relief from smoke.

Open fires provided both cooking and heat to the house - desirable in winter but unpleasant in summer. More efficient appliances changed that.

In recent years, wood pellet burners have become available that use pelletised sawmill waste in a sophisticated computer-controlled burner with an electric fan pushing heat into the room.

Built-in coal-burning ranges were soon imported from Britain, with freestanding models coming from the US. The problem was that, in these countries, high-quality bituminous coal was commonly used, but New Zealand had lower-grade sub-bituminous or lignite coals which did not perform acceptably.

This changed in 1871 when Henry Shacklock started his Dunedin South End Foundry. By 1873, he was making a cast-iron range that burnt the local coal and with a cast-iron flue that did not require a bricklayer to build it in. HE Shacklock Ltd continued to make its Orion coal ranges in many variations until 1970, although it was also making electric ranges from 1926.

Shift away from solid fuel

The 1960s quinquennial Census was the first to ask about home heating, although cooking fuels had been of concern since 1945.

In 1945, one-third of houses used electricity for cooking, over a quarter (28%) used gas and the rest (38%) used solid fuel.

Twenty-six years later, in 1971, most (87%) households cooked with electricity, with only 8% using gas and 5% using solid fuel.

In 1971, nearly half of households (45%) reported using an open fire as their principal means of heating, with a further 9% using a more efficient solid fuel appliance, 40% used electric heating, 4% had central heating and 2% (14,156 households) used the cooking stove or range as their principal means of heating.

The BRANZ Household Energy End-use Project (HEEP), completed in 2005, found 42% of households reportedly used electricity, 16% used gas, 31% used LPG and 10% used solid fuel as their main heating fuel. However, most homes had more than one heating fuel, and solid fuels remained the most important in terms of the heating energy delivered.

Improved wood burners

In the 1960s, convector fires were a popular alternative to the open fire but still allowed much heat to escape up the flue. From the 1970s, two local wood burners helped change the market.

The Kent wood burner - originally designed by South Island farmer Anthony Barker - was purchased by Shell NZ Ltd in 1979 and is still extensively marketed throughout the country.

The Pyroclassic - once called the Ugly Duckling - was designed in the early 1970s by DSIR scientist George Katzer. The double-burning design uses a cylindrical ceramic fire chamber. In the lower chamber, burning wood is converted to wood gas and charcoal. The charcoal burns at a high temperature on the insulated hearth fed by the primary air that enters above the glass window.



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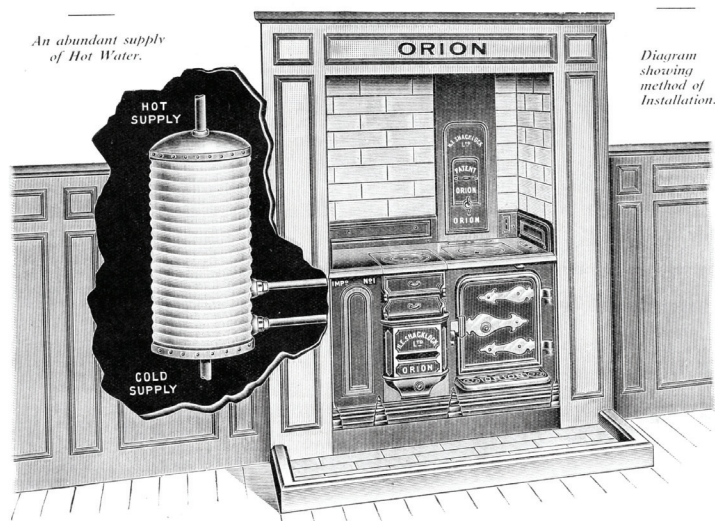
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In more recent years, wood pellet burners have become available that use pelletised sawmill waste in a sophisticated computer-controlled burner with an electric fan pushing heat into the room.

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Heating competition

Nowadays, the smog has disappeared from many New Zealand towns, and clean air zones have been used to promote electric, gas and wood pellet heaters rather than supporting the development of an improved efficiency wood burner.

Natural gas heaters, also fitted with sophisticated controls, efficiently, quickly and cleanly provide heat where there is access to a pipeline, while LPG can be used in other areas. There has also been a huge growth in the use of electric heat pumps (see Monitoring heat pump homes, *Build* 128, pages 34-35).

The good news is that, with improved thermal insulation requirements, houses now take less heat to keep comfortable. ◀