

Improved heating means better indoor temperatures in two Papakowhai homes

Full insulation and an efficient heat source led to substantial reticulated energy savings and indoor temperature improvements.

Beacon's Papakowhai Renovation project in Porirua tested various combinations of energy, water and indoor environment retrofits on nine ordinary 1970s homes. The houses were monitored before and after the renovations to determine how well each house performed. Results showed that a fully insulated home boasting an efficient heat source made substantial reticulated energy savings and indoor temperature improvements.

Several homes had heat transfer systems installed along with pellet burners and efficient wood burners. Often a central heat source does not warm beyond the main living area. Heat transfer systems or ducted heat pump systems push the warm air through to bedrooms and bathrooms ensuring an even heat through the house. These homeowners report finding that the wood burner combined with the heat transfer system heats the whole house.

The effectiveness of such systems depends on installing correctly sized heat transfer ducts and using suitably powerful fans.



House 1

Before renovation a wood burner was used to heat the open plan living areas in winter, while oil column heaters were used to heat bedrooms two and three. The family found the house cold in winter – particularly in the children's bedrooms.

The renovation included a change from an old wood burner to a new low emission pellet burner. This was combined with a heat transfer system to the bedrooms.

Not only did this see average winter temperatures in the main bedroom rise by 1.5°C but very low temperatures in the bedroom occurred far less frequently. However, average winter living room temperatures (15.7) and bedroom temperatures (14.3) were still below healthy levels. Using the pellet burner more often and for even longer will bring even warmer temperatures. Improved insulation and double glazing will improve the efficiency of this heating.

The family were pleased with the winter temperatures although they quite correctly still described the children's bedrooms as cold. The family describe the pellet burner as extraordinarily efficient, convenient, 'guilt free' and safe. In fact they increased the level of warming in the family room, running the pellet burner from 4 pm to 10.30 pm in winter. They did, however, find that the pellet burner was noisy and felt that costs of pellets were high.

House 3

Before renovation the house was heated with two heat pumps, a large unit upstairs, and a smaller lower efficiency unit downstairs in the offices. A fan heater was also used in the office area. A wood burner was occasionally used in the lounge but had rusted under a leak, and the childrens' bedrooms were heated with oil column heaters. There was a heat transfer system from the lounge into the master bedroom.

This variety of heaters was replaced by an NES-compliant wood burner and a ducted heat pump system. Full insulation and double glazing were installed to keep the heat in.

The changes resulted in significant temperature improvements in both living areas and bedrooms. Generally, both minimum and maximum temperatures were within or close to World Health Organisation healthy temperatures. In fact the average winter temperatures in the main bedroom rose by 3.8°C and sub 16°C temperatures (the minimum for good health) were almost totally eliminated.

With good insulation, the wood burner will be heating more efficiently without the heat escaping outside. A heat transfer system is an effective way to heat rooms away from a central heat source. The family found the house much healthier to live in and appreciated the warmer temperatures.



For more information:

- See Fact sheets on Introduction to Heating your Home
- Beacon website www.beaconpathway.co.nz/existing-homes/article/what-is-the-papakowhai-renovation-project

