

# Getting cozy in Queenstown

Many homes in the Queenstown Lakes District are either poorly insulated or totally uninsulated. These houses were often built for summer use only but are now lived in year round. This case study discusses the retrofit of one such house.

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**N**ew Zealand homes have historically been extremely energy inefficient. Even now, 30 years after insulation became mandatory, around 350,000 homes are poorly insulated or have no insulation at all.

## Initial retrofit not enough

In Frankton, a couple spent 5 years adapting their old house to make it perform better. Improvements included:

- removing internal walls to make an open living room
- adding large windows to the north
- retrofitting insulation in the ceiling and floor
- installing solar water heating and thermal blinds.

However, some parts of the house were still very cold in winter. For advice on how to improve it further, they called their local Eco Design Advisor (EDA).

## Thermal mass and water heating

The entire north wall had been opened up to the sun by converting 6 small rooms into one. A (locally sourced) stone floor had been laid in the 2 m strip adjacent to the glazing. Although it doesn't feel warm, this thermal mass regulates the internal temperature of the house by storing the sun's heat captured during the day and releasing it at night.

An enclosed firebox heats the house well, and the wet back also provides a back-up to the solar water heating. There are only 3 months in the year when any electricity is used for water heating. Solar panels were installed 5 years ago, and after some initial glitches, the solar has worked very well.

### EDA RECOMMENDATION

Minimise heat loss by insulating the pipes that run between the fire and the cylinder above and adding a cylinder wrap.



The living room, showing alterations such as the stone floor, north facing window and thermal blinds.

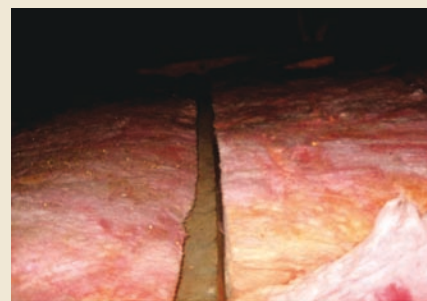
## Ceiling

Recessed downlights were not fitted in the living room during the renovation. Although favoured by electricians for their uniform light, they compromise the thermal integrity of the ceiling and potentially let moist kitchen or bathroom air through, which can condense in the roof space.

Extra insulation was installed in the ceiling, which reduced power bills and made the house feel warmer. Although the insulation was generally installed snugly between the joists without compressing them, on careful inspection, a few gaps were found. Even a 5 mm gap around the edge of insulation can reduce the R-value by up to 50%.

### EDA RECOMMENDATION

Add a second layer of insulation over the existing ones, running perpendicular. This covers up any gaps in the bottom layer while also covering the joists, which are a thermal weak point.



Well fitted insulation.

## Floors

Although parts of the existing floor had been insulated underneath with foil-faced segments or reflective foil, there were still some parts that were uninsulated and draughty.

### EDA RECOMMENDATION

Insulate the whole floor with foil-faced blanket. This will make the house warmer and reduce draughts as well. See the article on pages 25–26 for other insulation options.



The living room, showing alterations such as the stone floor, north facing window and thermal blinds.

### Old sash windows

Most of the windows are old single glazed timber sashes, with the exception of the new French doors. A significant amount of heat was lost through the windows, and this was making the bedrooms uncomfortably cold.

#### EDA RECOMMENDATION

Fit 'secondary' glazing, which is effectively a second, single glazed window fitted internally within the existing reveal. These can be fixed panes – which are cheaper – and can be removed in summer. The principle is to create a still layer of air between the window and the room.

Adding well fitting blinds or curtains as well will also provide a still layer of air. These can effectively make single glazing perform the same as double glazing.

Fitting draught strip to opening windows and fixing gaps in the frames of fixed panes was also recommended.

*The Eco Design Advisor is a BRANZ initiative. There are eight working around the*



Gaps can be seen beneath the heat recovery ventilation system.

*country providing a free service for designers, builders and homeowners wanting advice on any aspect of sustainable building: healthy materials, passive solar design, energy and water efficiency, renewable energy and landscaping. ◀*