

STYLE



The Now Home, Waitakere City, Auckland: looks conventional, but incorporates many energy-saving features at no extra cost.
Photo: Craig Robertson

Energy of

Solar design makes sense, boosting comfort and cutting costs. This technology may well be critical in homes of the future, writes **David Killick**.



Architect Helen Richards: her home stays warm by itself.

Nelson, despite its sunny reputation, does get cold in winter, with occasional frosts and temperatures falling to zero.

Architect Helen Richards has installed electric panel heaters in her hilltop home, which enjoys views over the town and ocean, but so far hasn't needed them. No matter how hot or cold it gets outside, the house retains a steady internal temperature between 17 and 20 degrees.

The home stays warm by itself. This is remarkable considering how cold many New Zealand homes get. The World Health Organisation (WHO) recommends a minimum of 18deg, yet the average is 14deg, and many homes struggle to reach that. Mildew and dampness are reported to occur in nearly half of New Zealand homes. Associated health problems include running noses, colds, rheumatism, headaches, eczema and asthma.

Householders worry about power bills, which are certain to keep going up.

Yet the solution is simple: better design. It needn't be expensive, or complicated.

Passive solar design relies on three principles, says Richards.

First, the house is elongated along an east-west axis. Extensive glazed areas within 30deg of true north collect the sun. Eaves provide protection from the sun in summer, and cedar blinds filter it out — creating an ever-changing pattern of light and shade. Bifolding doors and high clerestory windows — all double-glazed — provide natural ventilation.

Second, insulated concrete construction provides thermal mass. As well as external walls, the floor is solid concrete. An internal wall runs like a spine through the centre of the house.

Third, the heat is gradually and naturally released from the heat store. The temperature remains steady, with no peaks or troughs.

Solar water heating enhances the passive solar design, further saving money. Richards calculates savings are \$3 a day (assuming freestanding oil heaters) compared with a timber-framed house — or about \$600 a year. In other parts of the country, especially further south, where power bills of \$500 a month are not unheard of, savings would be even greater.



Versatile comfort: architect Helen Richard's Nelson home uses thermal mass in the form of solid concrete walls and floor to store energy. Despite the weather, it maintains an even temperature, slashing energy bills.

the future

Many other designers also specialise in solar design. Christchurch architects Russell Devlin (www.solarchitect.co.nz) and Roger Buck have both designed their own, as well as clients' homes, around solar principles.

Devlin, who organised this year's Sustainability Expo in Christchurch, believes energy-efficiency measures will become mandatory in new homes.

Roger Buck says New Zealand has been slow to promote energy efficiency. He believes energy is a major issue confronting the planet.

Richards agrees. As compelling as cost savings and comfort are, she says these are not her only motivations. "It's very important because of climate change. Saving energy on cooling and heating has a beneficial impact on the environment. It's all about energy consumption. That's what's damaging the environment."

Buildings are estimated to be responsible for 50 per cent of CO₂ emissions, which are blamed for causing climate change.

Big architecture firms are also incorporating energy efficiency. Warren and Mahoney has adopted an environmental protocol concentrating on all aspects of energy-saving design, including thermal mass.

"A new house should no longer imply a plasterboard-lined container wrapped in thin composite claddings with windows scattered pro-rata around the perimeter — our money can be more wisely spent," wrote architect Richard McGowan, of Warren and Mahoney, in *at home* in June.

New programmes are under way. The Zero and Low Energy Housing (ZALEH) project is being funded by the Foundation of Research, Science

ON THE WEB

Websites and houses to visit:

www.nowhome.co.nz (new energy-efficient home in Auckland); www.branz.co.nz (see "ZALEH" — Zero and Low Energy Homes, senior scientist Albert Stoecklein); www.eeca.govt.nz; www.solarindustries.org.nz; www.wanakahomestead.co.nz (boutique accommodation incorporating

solar design, including underfloor heating. Numerous links to other specialists); www.punakaiki-resort.co.nz — eco tourism hotel/motel complex.

The Christchurch City Council's energy-efficient home at 10 Leander Street, Papanui, (03) 352-4488, is well worth a visit.

and Technology and the Energy Efficiency and Conservation Authority (EECA).

"Clearly it's desirable for low-energy technologies to be adopted more widely if it means we can avoid or slow down the need for further power stations," says Albrecht Stoecklein, senior scientist at BRANZ (The Building Research Association of New Zealand).

Research has focused on the perceived benefits of energy efficiency, and studies looked at a variety of houses around the country.

In terms of cost efficiency, insulation was the big winner with estimated energy savings around \$600 a year for a low-energy house.

Computer simulation of low-cost housing in the ZALEH project showed that very high levels of insulation can almost completely eliminate the need for other forms of energy for space heating, even in quite cool locations such as Christchurch. However, this would require insulation at three to four times the level of the current code.

BRANZ is launching several new initiatives to promote sustainability and energy efficiency to the industry and consumers.

