



Living warmth: an internal concrete wall absorbs heat during the day and releases it at night.

Sensible shade: the living

Perfect proof

Nelson-based architect Helen Richards has created a package for a healthy solar-heated home that is affordable to build and live in.

Architect Helen Richards is reluctant to use a heater on a cold night, because she knows she is putting her reputation on the line.

If her Nelson home is cold after a sunny day, it means her design has not worked. The house, however, has been comfortably warm for the few months she has lived there, with the internal temperature staying between 16deg and 21deg.

The demonstration house is based on a design concept developed primarily for passive solar heating and healthy living. The design can be adapted to suit different styles and site demands.

Richards has chosen a contemporary style, and some visitors, who expected a more ethnic look, have been surprised by the clean modern lines and finishes, she says.

Features include a sunny, north-facing aspect with double glazing, rooftop solar water heating, good insulation, a polished concrete floor and exposed concrete internal walls.

Richards, 33, a member of the Royal Institute of British Architects, aims to show that environmentally smart can be just as stylish as other architecturally designed homes, and certainly more pleasant to live in.

She came to New Zealand as a tourist and decided to settle in Nelson. She saw a need for more energy-conscious designs and a chance to make a difference.

Her work arises from a deep conviction about reducing energy consumption. She studied sustainability in her spare time while work-

ing in British architectural practices, but her exposure to New Zealand's natural environment sharpened her enthusiasm.

Through her solar home design, she hopes to make it easier for people who want a comfortable energy-efficient home but find the prospect of extensive research and decision-making daunting.

"I've done the hard work, so now I can share it with others," she says.

Energy store

A passive solar house uses materials made of heavy mass to collect, store and release the sun's heat. Energy management is built in.

The heat storage material, in this case concrete, keeps the temperature stable, avoiding extremes.

Richards' house is basically an insulated box with concrete inside that insulation. It is clad in a variety of materials, including Zincalume, plaster and Lawson cypress, on a timber frame.

A few of the deviations from the concept plan are a curve in the front wall and a sunken lounge.

The house is oriented to the north for the views and the sun. For energy efficiency and comfort, it is best to have the largest windows on the northern side, so the sun can strike the heat-gathering material (the concrete floor). The south side should have only small windows.

Large, unshaded west-facing windows should also be avoided, because the low setting sun can make the interior too hot.

The home covers 180sqm, includ-



Areas open onto a wide deck.



Passive solar design: this Nelson home is the ultimate in energy efficiency.



Helen Richards: "I've done the hard work, so now I can share it with others."

ing a double garage, and is elongated from east to west to maximise its exposure to the northern sun.

The living areas and one bedroom are on the north side, with the other two bedrooms and both bathrooms on the south.

Vertical north-facing clerestory roof windows let light into the rear and a central internal concrete wall absorbs heat during the day and releases it at night, keeping the back rooms warm.

The concrete pad absorbs heat from the sun, and insulation beneath the concrete prevents heat from draining into the ground.

Most of the floor areas that catch the sun have been left uncovered, because carpet inhibits their heat-

absorbing properties. The tobacco-coloured polished concrete floor has a tactile appeal, says Richards. "It feels like leather."

Solar water heating is provided by a 1.25m by 4.8m Sola 60 rooftop panel that feeds a 225-litre medium-pressure cylinder. A rainwater tank stores water from the roof.

The windows are thermally broken aluminium-framed double glazing. Passive ventilation is included. Materials have been chosen for low toxicity and sustainability.

House package

Richards designed the house template house several years ago.

"I wanted to put something on the market that was available at a

low price and saved energy." The concept has been patented and is subject to copyright. Richards has formed a company, Powered Living Ltd, to provide architectural consulting and marketing.

The next step was to design her own house. "I have a lot of demonstration materials here. People can see and feel how warm it is. It looks at energy in a serious way."

She has gathered a team of contractors to supply construction, structural engineering, electrical energy advice and landscaping.

Keeping the cost down was a priority. A typical cost would be about \$1500 a square metre, depending on the home's size and design features.

The Powered Living package includes a consultation, site visit, initial advice, design ideas, price estimates, design development, the preparation of detailed construction drawings and a building-consent application. The basic design remains consistent, but is customised for individual clients.

Increasing interest

Why does it take a young British architect to show New Zealanders how good their homes could be?

Christchurch architect Roger Buck has long advocated passive solar design. He says interest has risen, especially after the electricity scares of the last few winters.

In creating a design that can be replicated economically, Richards is showing the discipline of her British architectural training, he says.

"The trick is to make good design affordable, with simple buildings that are easy to build."

The leaky-buildings issue has raised the awareness of quality construction, and energy-wise design goes with that, he says.

People coming from the United States and Europe demand good design, especially in the South Island where winter has a bite.

"Our Dickensian houses are not very comfortable."

He believes with architecturally designed houses, solar-design principles need to override the desire to make a statement.

City councils should also set higher standards for subdivision design, he says. —Energy Wise New