

# Build It

SELF-BUILD ■ RENOVATION ■ CONVERSION

An energy-efficient house  
built for just £127k

**50 GREAT REASONS**  
WHY YOU SHOULD  
BUILD YOUR  
IDEAL HOME

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**LIVING ROOM  
ESSENTIALS**

ROOM BY ROOM:  
**BATHROOM  
DESIGN**

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now worth **£750k**
- ★ A £100k NEW BUILD,  
now worth **£550k**

**OVER 2000  
PLOTS FOR  
SALE INSIDE**







## READER'S PROFILE

**Name** Helen Richards (33)  
**Occupation** Architect  
**Location** Nelson, South Island, New Zealand  
**Type of build** Self-build  
**Method of construction** Timber-frame passive solar design. Exterior clad in plaster, wood and corrugated zinc  
**Plot size** 700m<sup>2</sup> (7,535ft<sup>2</sup>)  
**House size** 180m<sup>2</sup> (1,937ft<sup>2</sup>)  
**Land cost** \$100,000 (£37,000)  
**Build cost** \$342,000 (£127,800)  
**Total cost** \$442,000 (£165,230)  
**Build cost per m<sup>2</sup>** \$1,900 (£710)  
(Note: \$1,500 (£570) on a level site)  
**Work started** June 2003  
**Construction time** Nine months  
**Current value** \$500,000 (£186,800)



As someone interested in energy conservation, Helen Richards had always dreamed of building a perfect home – one that reflected her values. Yet, as an architect, she had no intention of compromising on design or style.

After moving to New Zealand in 2000, this ideal of affordable, yet well-designed next-generation housing led her to set up Powered Living Ltd. Her design-and-build company integrates design flair and contemporary construction techniques with specialist knowledge on energy efficiency. Two years later, Helen put all this to the test when she designed her own energy efficient home, which she finally moved into in March 2004.

"Conventional buildings use a huge amount of energy," Helen explains. "In fact, buildings worldwide are responsible for 50 per cent of CO<sub>2</sub> emissions. My house is designed to capture and use energy from the sun to maintain a constant internal temperature of 17-20°C all year round. But it's not just energy efficient, it saves money, too."

### Going down under

Helen's adventure began when she and her partner decided to go travelling. They ended up in New Zealand, where there's a greater awareness of climate warming and the fragility of the earth's ecosystems. The couple moved into a flat in Nelson ▶





# Queen of the hill

Architect Helen Richards has designed and built the energy-efficient, 'power house' she has always wanted – on a hillside in New Zealand. But she had to move halfway round the world and set up her own company to do it

WORDS: BEVERLEY BROWN PHOTOGRAPHS: DOUGLAS GIBB





city at the north east tip of the South Island.

The region of Nelson is at the geographical centre of New Zealand, and is famous for its sandy beaches and national parks. It was here that Helen felt she could realise her dream of building a truly 'healthy', energy-efficient home – helped of course by 2,500 sunshine hours a year, rating Nelson consistently as New Zealand's sunniest spot and ideal for her 'powered living', passive-solar house.

Less than two years later, Helen had come up with a design for a one-to-two-storey timber-framed house, incorporating energy-efficient passive-solar heating – and most importantly, it was suitable for a building company to construct.

"There was a lot of work involved in preparing the design of the house and the detailing," says Helen. "It is a sophisticated design – the passive-solar heating is unusual in a 'normal' house. Getting everything right took months and involved some very experienced people, including architect Roger Walker, who had a similar idea for this type house in the seventies," she adds. To safeguard all this hard work and expertise, Helen had the design patented. "There's a lot of intellectual property embodied in this design," Helen explains. And bringing in outside help paid off in the long-term, too, as Roger Walker is now Helen's business associate.

### The right site

Finding the right site for Helen's house was crucial. It was essential to build it on a plot that would gain maximum energy from the sun. In the residential suburbs of Nelson, Helen found a site on a hill that not only captured that all-important solar energy, but had fantastic views over the sea.

One of the main challenges of the site was building on a slope. "A passive solar house is a actually a lot more cost-effective on a flat site," says Helen. "However, [apart from the slope], the site was carefully selected for solar aspect views, level above sea and river flood areas, and stability."

As far as planning was concerned, although Helen didn't get any encouragement from the local ▶



**Above:** Stainless-steel worktops and appliances give the kitchen a clean, contemporary look. **Below:** Glass doors and full-length windows fill the curved outer wall of the living space. **Right:** In the open-plan living area, changes in floor level help define the space. An L-shaped sofa fits snugly into a 'sunken' seating area, while steps lead up to the kitchen and dining space.











#### BUILD DIARY

- June 2002 Acquired plot
- Feb 2003 Applied for planning permission
- April 2003 Permission granted
- June 2003 Foundations
- August 2003 Timber frame erected
- Oct 2003 Roofing completed
- Nov 2003 Electrics completed
- Dec 2003: Plastering
- Jan/Feb 2004 Kitchen/bathrooms
- March 2004 Moved in



**Above:** Concrete flooring is crucial to the energy-efficient design of the house. Creating the polished, stone-effect finish was a complex business – but worth it to turn the floor into a real feature.

**Right:** A two-sided concrete counter separates the kitchen and dining area – both spaces share the view from the window.





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**Right:** A two-sided concrete counter separates the kitchen and dining area – both spaces share the view from the window.





**Above:** Like the rest of the house, the main bedroom is decorated in calm, neutral tones – but it's the only room with a carpet.

**Below:** Balconies run around the curved exterior of the house, so Helen can make the most of the sun – and the views.



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give it a reflective sheen, and scored to create the appearance of flagstones. The panels in the hall and sitting room are terrazzo – multicoloured stone chips set into concrete and polished when dry. Slabs of 5cm-thick grey concrete form a two-sided counter top and divider in the kitchen, and basin stands in bath/shower rooms.

Bringing the concrete to life, however, was something of a challenge for Helen. "Producing a concrete floor with a good colour is a hugely complex process, and it's something that most contractors get wrong. The selection of the subcontractor was critical – and time consuming – as was the patience of our main contractor," says Helen. "The floor had to be covered and protected for the duration of the build – right up to the finished stage. The concrete tilt panel walls (precast panels) – a rarity in residential buildings – were an interesting choice for sub-slab damp-proofing and insulation, and the finishing (ground exposed aggregate) had never been used before in this context."

**Wrapped up warm**

The house is extremely well insulated to prevent heat loss – concrete stores heat, but without good insulation it would dissipate. The insulation in Helen's house is wool – a natural and healthier alternative to fibreglass that allows her home to 'breathe'. It also has the advantage of reducing the likelihood of damp developing.

Double-glazing has been fitted throughout, with thermally-broken aluminium or solid timber joinery. Radiant heat is then released to warm the interior, the temperature never dropping below 17 °C in winter.

The roof, like most of the houses in New Zealand, is constructed from ribbed Coloursteel, which is a robust combination of coated aluminium and steel – it's the modern equivalent of the corrugated iron roofs that used to be shipped over from Britain.

At the front of the house, Helen opted for PVC-U downpipes and guttering, as it's a benign material that doesn't compromise the rainwater, which is collected, filtered and used for domestic purposes. The pipes and gutters at the back of the house, however, which merely drain water

away, are made from Zinalune – a durable steel/aluminium combination that doesn't need painting.

A solar panel in the roof heats all the hot water for the house, with a top-up electric coil to maintain the temperature in cloudy conditions.

**Light interiors**

Not surprisingly, considering its 'passive-solar' heating, Helen's house is full of light. Sloping ceilings with skylights and Velux windows let the light flood in, while the internal walls stop short of the ceiling, so the sun's energy can reach the back of the house. Glass sliding doors between the living area and hall ensure the sun's energy reaches the terrazzo panels in the hall during the day.

When it came to lighting, Helen chose halogen spotlights and pendant fittings with contemporary stainless-steel shades. More eye-catching still is an aluminium-framed, opaque glass partition, which partially separates Helen's office from the hallway. Lit from inside, it looks amazing at night and is a feature in its own right.

Porcelain tiles dominate the split-level bathroom, which has a Velux window above the basin and two small windows with wooden Venetian blinds above a sunken, double-ended bath. The basin's thick concrete base has three cupboards below. On a more practical level, white painted concrete panels on two walls conduct heat from the terrazzo panels in the hall.

The kitchen is a cool and contemporary work zone with grey steel-effect base units on three sides – with no handles to spoil the streamlined look – and stainless-steel worktops and appliances, including a free-standing fridge-freezer, built-in oven, and extractor above the ceramic hob. It's a layout that's ideal for entertaining – Helen can chat with guests in the dining or living area while she's in the kitchen.

When Helen moved in, the first thing she did was throw a party to celebrate the launch of 'House One'. "Having something to show people is a huge benefit for any design prototype," she says. "I found a beautiful spot for my first 'powered living house' – but without my family in England, none of this would have happened." ■