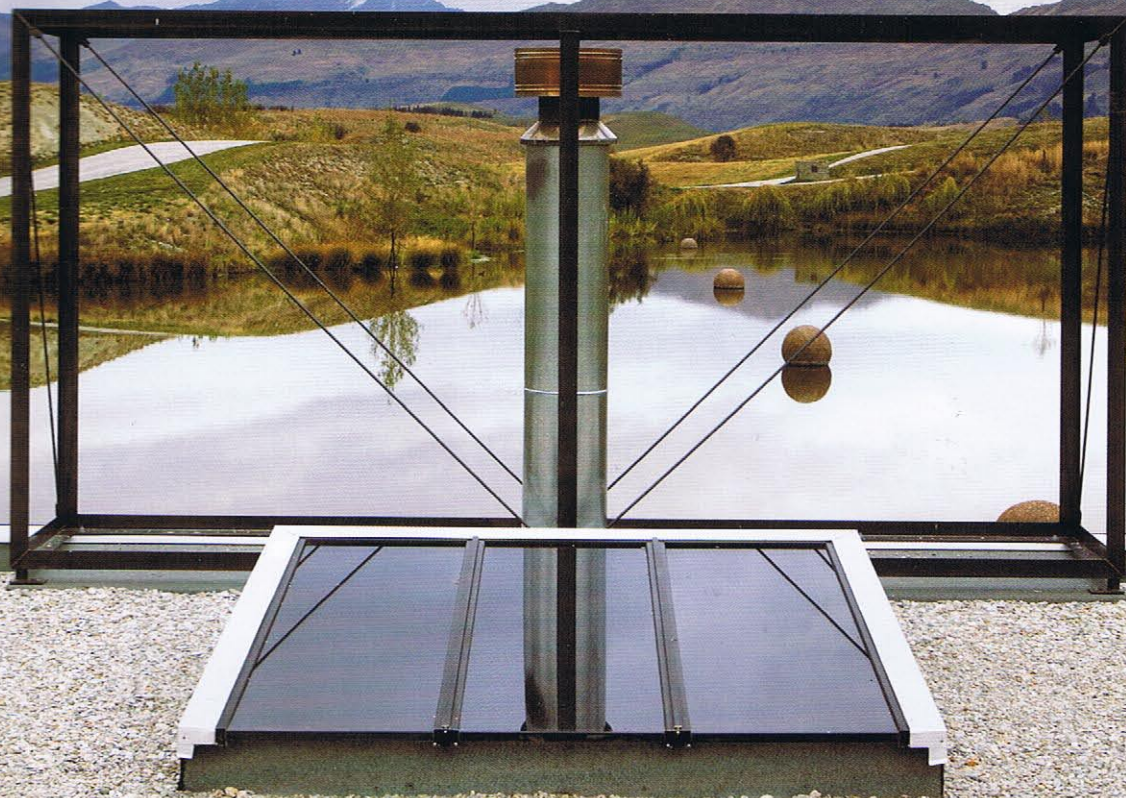


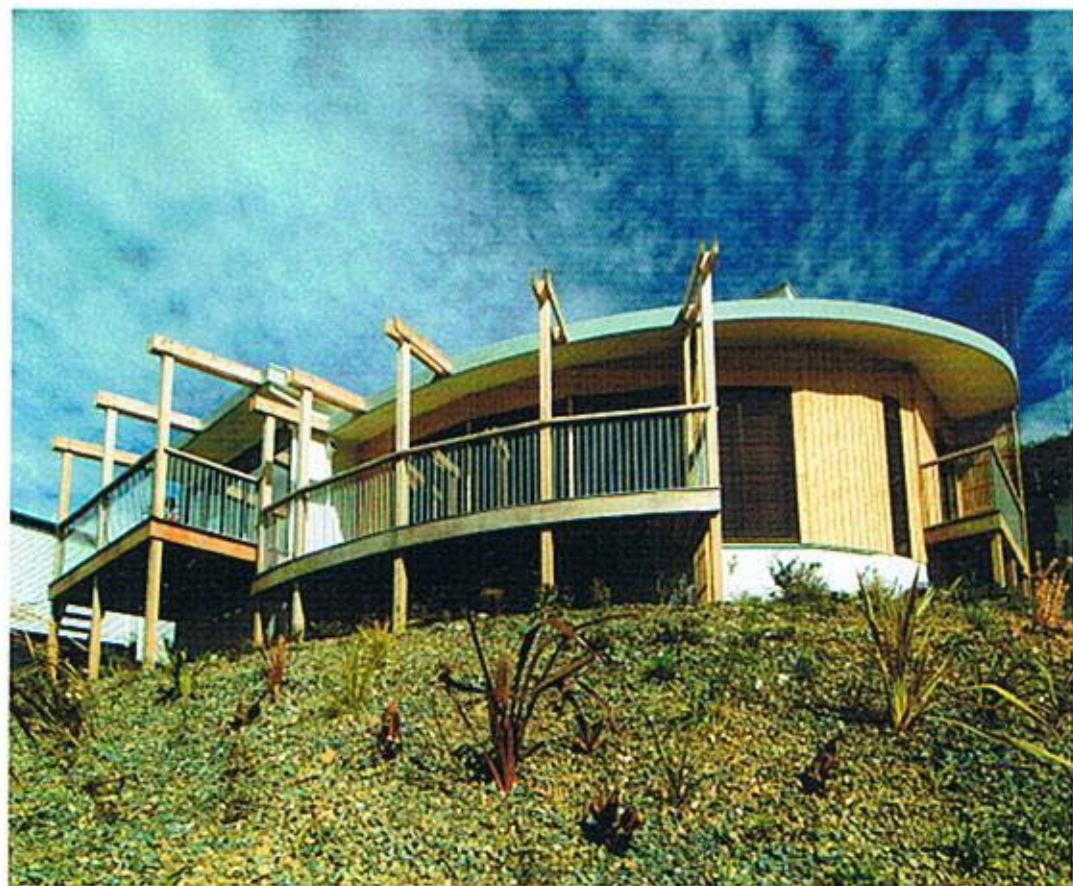
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POWERED LIVING

Helen Richards lives in a show-home, but one with a difference. "House One" is a passive solar house that is the design template and concept for Richards' new company, Powered Living.

Basically, a passive solar house faces north and collects radiant heat from the sun. The heat is stored in concrete inside the house, providing a constant heat after sunset. The result is a house that is not too cold in winter, nor too hot in summer. Richards describes sustainable building as "an awareness of energy consumption", a factor often overlooked in design. "Buildings can last for up to hundreds of years," she says. "But if they are designed badly they can use a vast amount of energy for heating and cooling... Powered Living focuses on solar design because it can result in a zero requirement for heating or cooling."

Sustainable building has been a passion of London-trained Richards since she was a student. She was inspired by architects such as Frank Lloyd Wright, Le Corbusier and Aalto – designers, she says, who did not prioritise appearance over climate and surroundings. Richards describes her own interest in solar design as "respectfully obvious": the sun is a "huge, natural free energy source".

Although Richards gained hands-on experience in the construction of an energy self-sufficient school in East London when a student, her opportunities to continue this interest after she graduated were limited. Instead, she studied the subject in her spare time while working for a variety of British architectural practices and earning membership of the RIBA.

New Zealand offered Richards the opportunity to put her passion into practice. Five years ago she and her

partner decided to settle in Nelson. With an average of 2400 sunshine hours per year, the city is the perfect location to design and build a house with optimum passive solar performance.

Richards is fierce about her beliefs. "I would say that I can appreciate a good-looking piece of architecture whilst not be able to respect it or be inspired by it unless it is engaged in some way with its surroundings like the climate. The energy consumed in buildings is one reason why our climate is changing, therefore I find it hard to work in a way that puts style over the environment."

Wellington architect Roger Walker shares Richards' enthusiasm for sustainable building and it wasn't long before Richards hooked up with him to help her develop the Powered Living concept. "Roger's experience has been invaluable because he did a similar type

of design project when he was working on Vintage Homes back in the Eighties," she says.

Walker goes on to explain: "I had experience of designing houses as a product where a standardised plan could be modified in different ways. This was aimed at a market that could not afford an architecturally-designed home but didn't want it to be designed by a developer either."

Walker says he realised that Richards' commitment to modular construction and passive solar design were similar to his own motivations in working with Vintage Homes. An architect for more than thirty years, Walker was well placed to advise Richards on local marketing conditions and technical issues such as materials and earthquake building regulations. Walker describes their working relationship as "very symbiotic" and says he values Richards' reciprocal input on projects he working on with his own company. "I have learnt a lot about passive solar design from Helen," says Walker. "I don't have her knowledge but I really admire what she is doing and we have learnt a lot from each other."

"House One", completed in 2004, is essentially an insulated timber frame house with a concrete slab. The only concrete walls run centrally through the house. Bedrooms and bathrooms are at the rear and less than 20% of this south side is glazed. The living area faces the sun at the front of the house; around 80% of the north face is double-glazed. A subtle curve to the west to follow the sun's path is a variation on the design.

The huge windows gather radiant energy from the sun. Eaves with an 800mm overhang control the amount of sunlight during summer and winter. Concrete absorbs and dissipates the heat. It these elements, the position of the glass in relation to the sun and of the concrete in relation to the windows, that are at the core of the passive solar design and that are essential to the concept.

It might come as a surprise that concrete features so strongly in the house since sustainability is key to its design. But it is the concrete tilt panels, normally used in commercial buildings, and a coloured concrete floor slab, that provide the thermal mass to keep this house at an optimum 16°C to 21°C throughout the year. The performance of the concrete floor as a heat

storage facility is equivalent to 20kWh of electrical energy (or 20 oil heaters burning continuously) in radiant energy from the sun. Concrete is also an efficient acoustic material. It is built inside the insulation so that there are no issues with damp proofing. The insulation in the walls and roof is Woolbloc, a natural alternative to fibreglass, specified 1.5 times higher than the Building Regulation recommendations.

Richards defends the use of concrete. The architect believes that one of the errors to which environmental architecture is prone is the selection of "green" building materials that don't relate to the local climate. Richards cites earth building as an example: "This might be a 'natural' material, especially if the earth is sourced locally, requiring no transport, and compared to concrete it is less energy intensive to make." But, Richards claims, "earth [building] is unsuitable for New Zealand's climate. It is a form of construction that originates from Africa where there is a climate of extreme heat and dryness. As a result, this type of construction is not greatly water resistant and although it can regulate heat in New Zealand we still require a bit of insulation".

Richards is quick to point out that although the concept of Powered Living involves a holistic approach to sustainable design, it is "impossible to be pure in every respect". Instead, she describes the design process as "making the right choices in the right order of priority, such as the heating/cooling process during the lifecycle of the building, which is where solar design comes first".

What perhaps distinguishes Richards' concept from other sustainable houses is her focus on conventional building materials and methods. She points out that Powered Living houses use the same methods and materials as a non-solar house but "in a different layout". In a competitive property development market, her strategy has been developed in part to ensure that builders don't reject her concept as too "different", and in part to keep costs down.

"House One" approaches cost savings holistically. "Concrete slab construction is just as cost effective as timber frame construction on a flat section," Richards says. "The internal tilt panel concrete walls are the most

cost effective form of vertical masonry construction but labour costs are more expensive than timber framing because of transportation and craneage. We have proved this type of house design can be just as cost effective as other 'normal' types of construction – and this includes double glazing, solar hot water, and extra insulation."

Although passive solar houses can be designed to look and feel like any other home, the Powered Living concept favours a contemporary style. This was deliberately chosen for mainstream appeal – to persuade clients that not all energy efficient houses have to appear "hippy". But the notion of a concept plan rather than an individual response to a client brief does raise the question: is this a 'one-size fits all' project?

Richards rejects this suggestion. "With any passive solar house there are a number of principles that are employed and the concept house embodies these principles entirely," she says. "It provides a framework with which to marry these principles with individual space requirements and style. The design was developed for adaptability to be a high priority ... within the shell of a passive solar house [this] is relatively straightforward."

The kitchen and living rooms can be re-arranged and the number and positions of bedrooms and bathrooms can be changed. The Powered Living house can have 2-3 bedrooms, or it can be on 2 levels with 4 bedrooms. Clients can choose from a palette of materials for the floor and exterior cladding, and finishes and fixtures can be changed. "It's neither a standard specification house package nor a conventional architectural design," Richards says. "It has much more flexibility than a spec house but it is cheaper than architectural design."

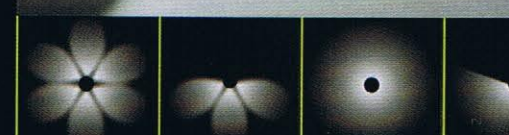
Richards believes that sustainable practice can be applied to any building project and hopes that more designers will work this way. "Self-sufficiency is a good feeling," she says, "and we are trying to demonstrate a better way of living. But of course style counts, too – we are architects! We can make it easy for clients and we have the information here if they choose to use it."

Jane Crittenden

Petals of light



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