

# concrete

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## Top Marks for A+ Home

A CONCEPT DESIGN FOR AFFORDABLE,  
COMFORTABLE AND ENERGY EFFICIENT LIVING

## Prefabricated Living

IMPROVED QUALITY WITH REDUCED  
COSTS AND TIMEFRAMES

## Powered Through Passive Design

WAIKATO HOUSE ACHIEVES 60%  
REDUCTION IN ENERGY CONSUMPTION





# POWERED TOWARDS SUSTAINABLE LIVING



FOLLOWING A BRIEF FOR A FAMILY HOME WHICH SOUGHT TO CONSERVE ENERGY THROUGH PASSIVE SOLAR DESIGN, POWERED LIVING (NORTH ISLAND) LTD LOOKED TO INTEGRATE CONCRETE'S THERMAL MASS WITH APPROPRIATE LEVELS OF GLAZING, NATURAL VENTILATION AND INSULATION.

Situated in the Waikato, the 240m<sup>2</sup> three bedroom home was completed in early 2008 on a modest budget. Findings from a year's worth of data collection (2009-2010) have been extremely encouraging, revealing that the house consumed a mere 3050kWh of power compared to the New Zealand annual average of between 8000 – 10000 kWh. Furthermore, during that time the internal temperature did not drop below 17°C degrees. By the end of 2010 it is anticipated that the house will be energy neutral as a result of a 3.3 kW Photovoltaic system which is currently being installed.

Working with the primary design objective of optimum energy efficiency, the house designers endeavoured to maximize heat transfer from the northern public building block to the southern, more private building block. Essentially, the northern block is a double glazed glass box which traps and stores the sun's heat in the concrete floors (R3.4) and internal masonry walls. When the temperature drops in the evening the heat is transferred to the southern (cooler) building block by a natural process of thermal conduction and air convection. The southern block is a timber box with thickly insulated timber walls (R3.6) and minimal window openings to reduce heat loss.

The house is oriented due north to enhance solar gain and take full advantage of the low angled sun during the colder winter months, which heats the exposed internal concrete elements. Throughout summer the house cools itself through natural ventilation provided



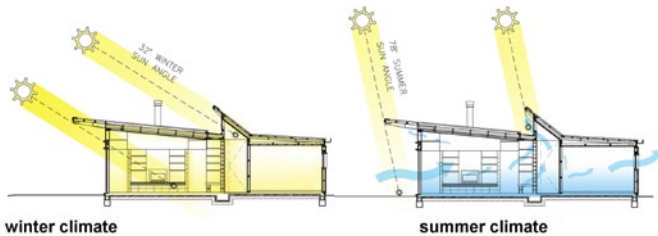
by a central clerestory. During winter negative air pressures are created within the clerestory by southwesterly winds which assist continual air ventilation through the sleeping areas, and across the entire house.

Along with its main emphasis on passive solar design, the house demonstrates other sustainable building features, such as rainwater collection, passive water heating, along with on-site waste water treatment and use of chemical free timbers and paints.

Duncan Firth of Powered Living (North Island) Ltd believes that the house is a realistic attempt to achieve an affordable, energy efficient house with off the shelf technologies and materials. "With around a 60% reduction in energy consumption compared to similar sized homes Powered Living (North Island) has demonstrated that passive solar design offers a genuine mechanism to create a naturally comfortable and healthy living environment for the whole family to enjoy, one which also saves you money."

*Powered Living (North Island) Ltd won the joint Excellence in Residential Concrete Construction Award at the 2010 Concrete Sustainability Awards.*

*Powered Living (North Island) Ltd – www.poweredliving.co.nz*



Images (including cover) by Frances Oliver

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