

Maximising sun and space in this eco-friendly terrace

A sunny courtyard that provides light and ventilation to every room is at the heart of a BASIX-compliant home in Manly that highlights the liveability of homes designed with the environment in mind.

Built on a narrow site in Sydney's northern beaches, this family home is a beautifully-designed, modern living space with cutting-edge environmental features that met BASIX requirements – the NSW Government's Building Sustainability Index – long before it went into effect.

The house has a single storey street frontage, in character with other homes on the street, and two levels at the rear that provide open and spacious living areas throughout. The roof slopes steeply to the south over the centre section, sharing sunlight with the house next door.

To maximise passive heating and cooling the Manly courtyard home is exceptionally well insulated and has very high thermal mass. There are thermally-efficient concrete floors on both levels and all internal walls are made with CSR Hebel Block, an aerated concrete product that provides excellent insulation with less weight than conventional building materials.

The house has even been designed to allow for the recycling of the construction materials. Both the concrete and Hebel can be crushed for re-use, while window, door and general joinery allows for removal for recycling and replacement without disturbing the home's structure.

According to architect, Tone Wheeler of Environa Studio, the courtyard design, while still unusual in Australia, allows privacy, security, maximum solar penetration and good cross-ventilation.

"Architects will need to consider alternative and better conceptual and technical designs in order to meet BASIX performance standards," he said. "Practically that means good orientation of window glazing, courtyard planning and good cross-ventilation. Technically, it means increased thermal mass, better insulation and good water management integrated throughout the house design.

"BASIX encourages a change in thinking away from adapting existing home designs and tacking on environmental features to completely altering home designs to better suit our environment," Wheeler said.

An audit of the home's total electrical energy use in its first year found that it used an estimated 60% less than of average Sydney home's daily use thanks to its passive solar design and energy efficient lighting and appliances.

Rainwater is collected from the roof and passed through a first flush diverter and filter system. It is then stored in a tank beneath the carport for garden use and is designed to be used for toilet and laundry use in the future. A small shed at the rear of the house contains home services such as the diverter and water filters, instantaneous gas hot water system and central vacuum system.

A dedicated area for sorting and recycling household waste is also provided to make it easy to manage.

"BASIX encourages a change in thinking... altering home designs to better suit our environment"



A view of the courtyard from the second story master bedroom.



As the site was not conducive to solar power (there is no direct northerly sunlight access), natural gas is used for hot water, cooking and space heating and the home's residents are using 100% Green Power for their electricity.

Low energy fluorescent tube lighting, hidden in purpose-designed pelmets that direct light upwards, creates even light at greatly reduced energy output.

Private courtyard

The Manly home's courtyard maximises sun and light from the north side property boundary, creating a totally private living area at the centre of the house. All ground floor rooms have multiple sliding doors that open onto the courtyard and upstairs rooms look down into the main courtyard. The house footprint has been reduced from 75% to 68% by the development of three landscaped courts with plants used to ensure maximum water absorption.

In addition to maximising light and ventilation, the courtyard centre of the home provides excellent outdoor living space and a less compartmentalised environment extremely well-suited to family living.

"We went from having a dark and dingy house to one that has sunlight no matter what time of the day. It's great for us and the kids," said homeowner Tracey Mietzke.

"From our point of view, we really wanted a home that was soft on the environment that had a great design and that's what we got," she said.

"While you can try to make any home design comply with BASIX, those designed to relate to their climate and water conditions will score much better and ultimately will be better homes to live in," Wheeler said.

Within a decade of implementation, BASIX is expected to save 287 billion litres of water and reduce greenhouse gas emissions by 9.5 million tonnes.

Sustainable Features:

- Rain water run through a first flush diverter and water filter for garden use.
- Windows and doors on two sides of each room for excellent cross ventilation.
- Exceptional thermal density through use of concrete floor and wall tiles.
- Internal stairs draw cool night air to upstairs bedrooms for daytime cooling.
- Mechanical ventilation draws cool air from the basement, which doubles as a cold store area.
- Low energy, fluorescent tube lighting.
- Instantaneous gas hot water system.
- Low flow 3A-rated fittings for bathrooms and sinks and dual flush toilets.
- C-Bus electrical system controls lighting with automatic cut off.
- Efficient 5 star rated appliances.
- Clothes drying line.
- All internal finishes low outgassing and low VOC paint used in all internal areas.
- Timber floors treated with a pure tung oil for low outgassing.
- All timber recycled or from plantation sources.

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