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Contents

Features

The demarcation between the two houses has been blurred to foster engagement between the households. The shared life that will grow between the families will be particularly beneficial to the children, playing together and sharing possessions – and fridge contents.

INSPIRED INFILL

Two families pool resources to create a model for sustainable living in the city

By Helen Norrie and Alysia Bennett

GREEN INTERIORS

Beyond fads and greenwash

By Jenny Brown

Most of the attention paid to sustainable houses these days is on the external envelope: "bricks and mortar", cladding, roofs, footings, and how it all comes together.

Most green home builders and renovators roughly understand the principals of passive solar, cross-ventilation, insulation, rainwater and greywater harvesting. They are aware of the pay-offs to the environment and their hip pocket. As the pundits say, "it's not rocket science".

But when it comes to fitting out interiors, the knowledge base is murkier. This is despite interiors being fraught with environmental hazards. So many surfaces, appliances, furnishings, fittings and fixtures coalesce to make up a house interior that it's not uncommon for a house with great passive design being let down with a poorly thought-through fitout.

This is not as it should be. Interior design is where ecologically responsible building gets really personal.

TOXIC INTERIORS

It's been common knowledge for over a decade that sick buildings can have a detrimental impact on human health and psychology. Escalating levels of childhood asthma are being linked with high levels of toxic vapours that "off-gas" from walls, carpets, cabinetry and the hundreds of other household items – most especially when they are new or wet – but in some cases long after their installation.

"Have you ever really smelled a plastic shower curtain?" asks Robyn Galloway. The Melbourne-based designer and founder of ESO, the Environmentally Sustainable Objects Group says there are so many VOCs (volatile organic compounds) in modern consumer goods that in enclosed spaces their potentially toxic gases can recombine in ways that haven't yet been calculated. Some VOCs are natural. Others, end products of petrochemical chains, are manifestly unnatural.

"Some buildings," says Ms Galloway, "take 10 years to stop off-gassing because VOCs are contained in formaldehyde, glues, standard particle boards, solvents, paints, timber sealants, vinyls, plastics, in household cleaners…in almost anything you can name. Without question we've been living in toxic environments."

"VOCs," says head of interior architecture at the University of New South Wales, Dr Kirsty Mate, "are not as dangerous as asbestos but they are listed by the World Health Organisation as human carcinogens".

VOCs, most notoriously present in some compressed timber fibre boards (aka particle boards), are just one of the known hazards pushing responsible sectors of the furniture and interiors industries to rapidly redress their manufacturing processes.

"There has also been quite a drive from the general public. The industry is trying to improve its product because it is, after all, connected to its bottom line. Newer particle boards, for instance, have a lower level of VOCs and some have a zero formaldehyde content."

Though informed designers and manufacturers have been onto greener options since the early 1990s, Kirsty Mate says the revolution currently sweeping through her industry is becoming so entrenched and exciting "that it is one of the most innovative, creative and progressive things happening anywhere".

We're a long way from when Dr Mate was told by colleagues that "it's just a fad".

Environmentally-conscious interior design and architecture is also "starting to lose that dowdy image". There are countless brilliant innovations and ideas being adopted and adapted right across the world. One of her favourites is cardboard kitchen shelving: "It could replace particle board, could last for a few years and it can be recycled".

> "VOCs are not as dangerous as asbestos but they are still listed by the World Health Organisation as human carcinogens"

Queensland-based interior designers Mannigan Edwards International specialise in eco-friendly interiors. Their design of a display apartment in Southport Central on the Gold Coast includes a GECA certified sofa made by Jardan, upholstered in 100% flax. The curtains in the living room (above) are 100% linen, and in the bedroom (right) are 100% hemp. The bedroom also includes a bed head made from 100% recycled timber, organic cotton sheets and a cotton, wool and coir mattress. Photos: Mannigan Edwards International.

VICTORIAN REVIVAL

An ageing terrace gets a new heart

By Mara Ripani

BUILDING YOUR SUSTAINABLE DREAM HOME

A guide to get you there

By Alan Strickland with Judy Celmins
Photography by Nettle Noise & Pictures

ALL TOGETHER NOW

An eco development strikes gold in rural Victoria

By Fiona Negrin

Lilting bird song, stately river red gums and abundant foliage give the impression that we're far from civilisation. So it's a pleasant surprise to realise that the local shops and train station are a ten-minute walk away. Gently perched in the landscape, so modest you don't notice them at first, are eight small homes. Welcome to Munro Court, a sustainable housing development in the old Victorian gold mining town of Castlemaine.

"The idea was to build very small houses with a modern feel but rustic aesthetic; homes settled in Australian bush gardens," says designer Robyn Gibson of Lifehouse Design, based in Castlemaine. The development was initiated by a local couple, Sue Turner and Don Wild, whose vision was to build a cluster of energy-efficient modern houses that harmonised with the landscape. Social sustainability would be a key criterion, as would the potential for elderly people to downsize in comfort and age in place.

Sue and Don teamed up with Robyn and Paul Hassall of Lifehouse Design, and Sue's son Sam Cox of Sam Cox Landscaping, to turn the vision into reality.

Although the houses are placed quite close to each other, they don't have boundary fences, so strategic design was employed to instil a sense of seclusion.

"All living areas face onto the sleeping and bathing areas of the neighbouring house, so nobody's living areas look into any others," says Robyn. "Additionally, there are screens, earth mounds and plantings between houses to provide privacy."

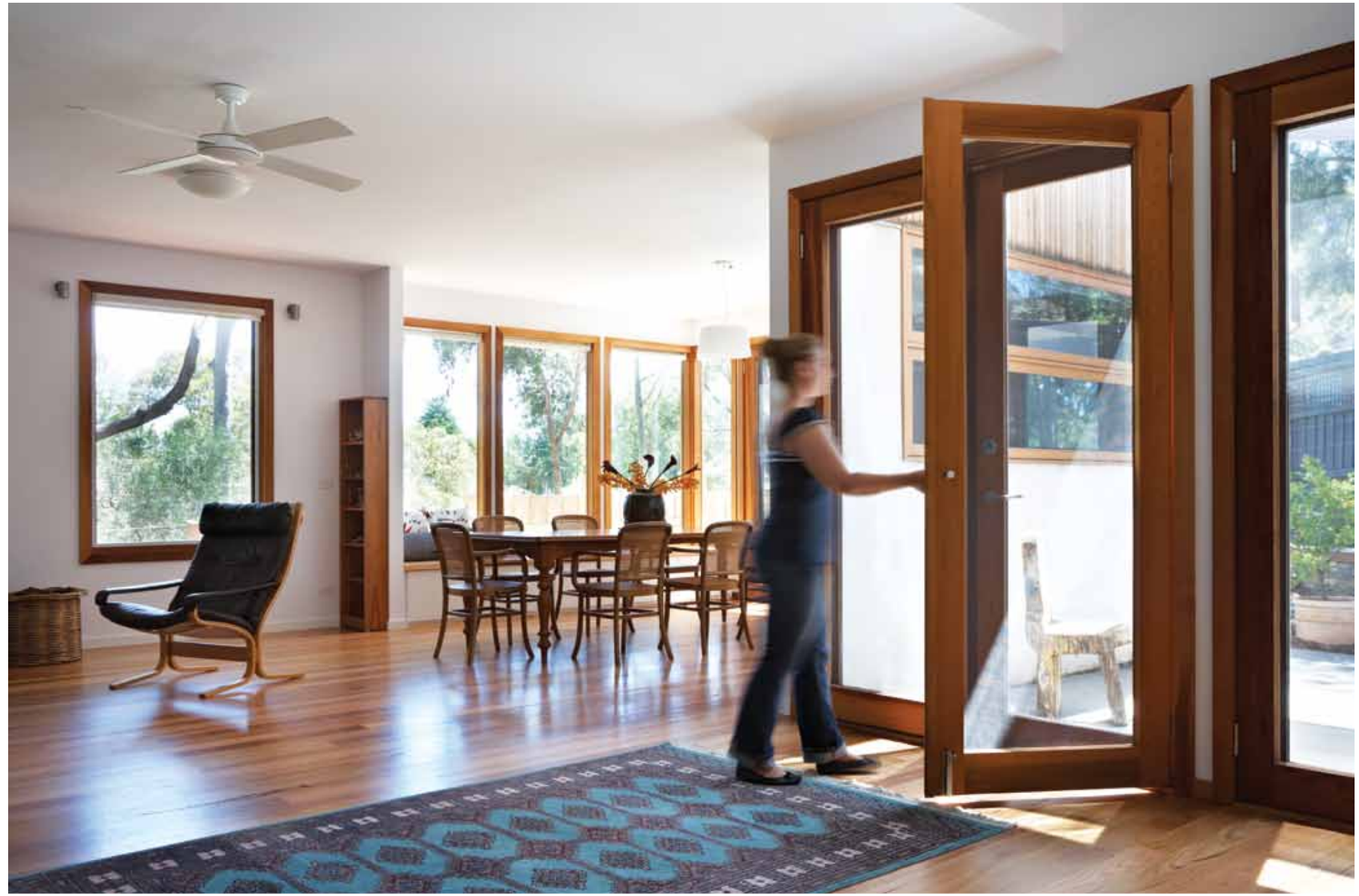
Robyn and Paul worked closely with Sam to harmonise the houses with the landscape. The homes, none of which is larger than 150 square metres (the average new home in Australia is around 240 square metres), share an unobtrusive colour scheme of soft grey and tan, and are built with natural materials of bricks and timber, including *Cypress macrocarpa* reclaimed from farm windbreaks. Remnant old trees frame the plantings, which are all local species. Robyn muses, "The whole court is filled with foliage – you look at the gardens, not the houses". Thanks to appropriate species choice and generous mulching, the plants have thrived in a climate of increasingly drier winters and hotter summers.

OPEN HOUSE

An old house gets recycled

By Fiona Negrin

The house boasts a 1.98kW grid interactive photovoltaic system and an evacuated tube solar collector for hot water. Evacuated tubes work in all seasons and are more efficient than solar panels. They aren't dependent on direct sunlight, which means they work in cloudy conditions. As the tubes are round they passively track the sun, providing stable heat output.



"One of the key sustainable design decisions they made was to retain elements of the old house, rather than to build from scratch"

The home has been designed with two-layered external doors. A double-glazed door fronts the elements, while an internal lockable flyscreen door allows the glass doors to remain open throughout the night, maximising the ability of cooling breezes to penetrate the home effectively.

WINDOWS THAT WORK

Good windows will repay your investment

By Michael Green

Windows might be transparent, but they're complex. Good windows well placed will help keep your home comfortable all year round. Bad windows in the wrong place will cost you dearly.

In a typical insulated house, windows cause more heat gain or loss than any other part of the building fabric. While they're expensive up front, they're an investment in the resale value and day-to-day comfort of your home.

So which windows should you choose? There are hundreds of products and combinations to consider, from the glazing, frames and coatings, to the size, shape and location. The Window Energy Rating Scheme website (www.wers.net) lists detailed ratings of over 40,000 products.

Two years ago, Alan Kerlin designed his sustainable home in Canberra. Afterwards, he established a consultancy, Solar Flair, to help pass on what he found out. When he was researching windows, he found good advice hard to come by. "It's a difficult area, but it's easier if you understand some of the basics behind the science," he says.

Heat transfers in different ways – for windows, you'll need to consider conduction and radiation. Conduction refers to the ambient warmth that passes through the glass and the frame. A window's conduction is measured by its U-value. The lower the U-value, the better its insulating qualities, and the better for your electricity bill.

Radiation, in contrast, refers to heat transferred when sunlight passes through the glass, hits something and warms it up. The visible light is converted into heat as it is absorbed by a thermal body and re-emitted as long-wave or infra-red light – heat. Radiation is measured by the window's Solar Heat Gain Coefficient, or SHGC; the higher the SHGC, the more radiant heat it lets through.

PASSIVE SOLAR DESIGN

Armed with a bit of knowledge, you need to consider the weather where you live and the design of your home. Most Australians live in climates where we want to draw in extra warmth during the cold months and shut it out throughout the hot months. With careful consideration, your windows can help this happen – together with other elements of passive solar design, such as shading and orientation.

In Canberra, Kerlin designed his home with a bank of glass to the north – the sun streams in throughout winter, but eaves and shading block the direct rays in summer. Small windows to the south, east and west help reduce the solar access when the sun is low in the sky and passes below the awnings. "But remember: it all depends on where you are living," he says. "In northern Australia, you never want sun hitting your glass at all."

INSULATING GLAZING UNITS (IGUS)

No matter your location, there is one constant: double glazing is always preferable to single. For now, nearly every Australian home has single-glazed windows. "They're like a thermal wound in the building envelope," says Gary Smith from the Australian Window Association.

Double and triple glazed windows – known as IGUs – help seal the wound. "Standard double glazing can reduce conducted heat

The ultimate in glazing combined with external shading. This Sunpower Design home features double glazed windows with fold-up shutters on the northern facade that double as external decks. Photos by Rhiannon Slatter.

VIEWS FROM AFAR

A bayside home in sympathy with its surroundings

By Judy Friedlander

High-level louvres and openable windows maximise light and opportunities for cross ventilation and venting of hot air, and ensure those all-important views are present in every living space.

> "The land is a small part of a property that was in my family for four generations"

"The house is built on piers and this kept excavation to a minimum, but it still allows us to use the space under the house for a carport, rainwater tanks and storage area."

The home's many windows allow for highly effective illumination, ventilation and those all-important views.

"The wedge shape of the house affords the inhabitants privacy while making the most of the aspects and views from every room," says Sanby.

"On the western elevation, a series of angled bay windows provides views from the bedrooms and bathrooms and form a three-dimensional and rhythmic facade."

Sanby explains that cross-ventilation is optimised by the high-level louvres on all sides of the house, combined with the fact that the rooms are not too deep.

Northern light infuses the house and enters the central area through strategically placed windows framing the two wings.

"The flat roof in between the two pitched roofs allows light to enter from the north even into the south-facing rooms," says Sanby.

"The high ceilings with high windows looking out onto the surrounding greenery give the house a wonderfully light and spacious feeling," says the owner. "The open-plan living area which includes the decks feels very spacious – while the bedrooms in the other wing feel quite private.

"I just love being in the master bedroom and being able to look out the window at the great limbs of the *Eucalytus punctata* and the turpentine *(Syncarpia glomulifera),* and see the cockatoos in the distant spotted gums.

"It is such a thrill to have this beautiful house. It is my dream come true."

Sustainable Features

Bayview Residence

Designer	Utz-Sanby Architects
Website	www.utzsanby.com
Builder	Steele Associates
Location	Bayview, NSW
Project type	New building
Project cost	$750,000
Photography	Marian Riabic

Hot water
- Quantum compact 270L heat pump hot water system

Water saving
- 2 x 4500L rainwater tanks for garden, washing machine and toilet flushing

Passive heating & cooling
- Natural ventilation
- R1.0 foil-faced Autex Greenstuf building blanket
- R3.2 Autex Greenstuf batts
- R2.5 Acousti-Therm batts
- R2.0 Quietstuf batts
- Sub-floor concertina boil batts

Active heating & cooling
- Hunter Pacific Concept ceiling fans

Building materials
- Carter Holt Harvey Ecoply cladding
- Tallowood flooring and decking
- Colorbond roof and cladding to stair
- Powder coated aluminium door frames
- Western red cedar window frames

Windows & Glazing
- Breezeway louvres

Lighting
- Fluorescent battens
- Wall mounted up-lights

Other
- Bush regeneration by Total Earth Care (www.totalearthcare.com.au)
- Minimal site excavation
- The size of the house and decks is modest and covers only a portion of the 1500m^2 site

OVER THE TOP

This steep roof is more than just a bold gesture

By Rachael Bernstone

LIGHT HEAVYWEIGHT

Leafy North Adelaide sports a stylish home with a sustainable edge

By Stephen Crafti

Barbara and Ian always knew their leafy North Adelaide block had potential. Located on a compact site abutting a golf course and parkland, they were aware of views that weren't being taken advantage of. Hemmed in on either side by substantial homes (one heritage-listed), the obvious solution was to extend vertically. "I wanted a separate studio where I could paint and we also wanted separate guest accommodation," says Barbara.

One of the architects the couple most admires is Glenn Murcutt, which is how they came to commission Troppo Architects. Architect Phil Harris, co-founder of Troppo and Adelaide director, had worked with Murcutt and like Murcutt, Troppo are recognised for "touching the earth lightly", a phrase that's come to represent lightweight and sustainable architecture. "We didn't want a concrete bunker. We were interested in using materials that responded to the environment," says Barbara.

Troppo's diverse material palate features rammed earth, copper cladding and timber, giving weight to nil finish and low maintenance materials. The rammed earth in the house, quarried locally, not only has low embodied energy but creates excellent thermal mass. Working with good passive design it stores coolness in summer and heat in winter, then

Abundant vegetation in the courtyard helps pre-cool breezes before they enter the house. Coupled with windows with large openings and doors that open fully to allow the free passage of breezes, the house is kept cool with minimum active cooling – even during Adelaide's notorious heatwaves.