Tim and Edwina's rebuild delights passers by with its angular timber facade, and its occupants with its 8.2 Star House Energy Rating.

Style & sustainability

Sustainable design is on show and hidden in the detail of this urban Melbourne home.

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PHOTOGRAPHY Nick Stephenson

AN ANGULAR TIMBER FACADE AND A Japanese-inspired Zen garden greet visitors as they arrive at the zigzagging fence of this new bayside Melbourne home. But the home's delights and environmentally sustainable design details are revealed as you move inside.

The entry funnels through a hallway, lined on one side with enviable floor-to-ceiling storage and a guest bedroom, bathroom and roomy laundry with a suspended drying rack. Finally the hallway opens onto an open-plan kitchen, living and dining room, expanding to the full width of the home. Solitary pendant lights hang over a timber-clad kitchen island bench. A grass-green rug and comfy low lounge soften the polished concrete slab. A stairway with feature masonry links this level with upstairs. Picture windows and sliding doors frame the garden.

At every glance this home accomplishes owners Tim and Edwina's goal of combining style and sustainability. But it wasn't always so.
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The concrete slab in the open-plan living, kitchen and dining room at the rear of the home acts as a heat sink as it soaks up winter sun from the north through large double-glazed and timber-framed windows.

The new dwelling replaces the 1930s brick home the couple had bought some years earlier. They had always planned to renovate, and after mopping up the near irreparable damage of severe storms in 2011 their minds were made up. They decided to start anew, inspired to emulate the older, thermally comfortable elements of their original home. They also wanted to ensure their new home would withstand the challenges of a changing climate.

The couple enlisted Sunpower Design to help create a four-bedroom, two-storey home to withstand booming utility prices, storms and relentless heat waves. It was a challenge Sunpower partners Andreas and Judy relished.

"The important thing when designing a sustainable house in the Melbourne climate used to be about heating load, but now summer load is becoming more important" says designer Andreas. "It's getting harder to cool down a passive house." Luckily, he adds, new materials and technologies can achieve better performance and are becoming more affordable. In this home he utilised phase change pellets in sheets under the plasterboard in the master bedroom to help regulate temperatures. "Our room on the hot days [last summer] was really pleasant," says Edwina. "It was 44 outside", adds Tim. Impressively, the first-floor, west-facing room maintained a temperature of 26 degrees with no air-conditioning.

The 8.2 Star-rated home is elevated a metre off the ground, fitted with solar hot water, a 7.5kW solar power system, 20,000L of water storage under the front garden, ceiling fans, double glazing, LEDs, low emission cabinetry – the list goes on. Naturally, it's designed along passive design principles. Casement windows – selected because they open fully to allow maximum air exchange – vent hot air and admit cooling breezes. The ideal east–west orientation allowed Andreas to maximise glazing to make the most of winter sun; internal insulating blinds and motorised external blinds protect the home during summer.

Tim, Edwina and Andreas' decision to include a suspended first storey concrete slab perhaps best describes the team's approach to sustainability. They thrashed out whether to spend bigger on infrastructure to optimise comfort or

Skylights and carefully positioned windows keep this home light and airy while maximising winter solar gain.

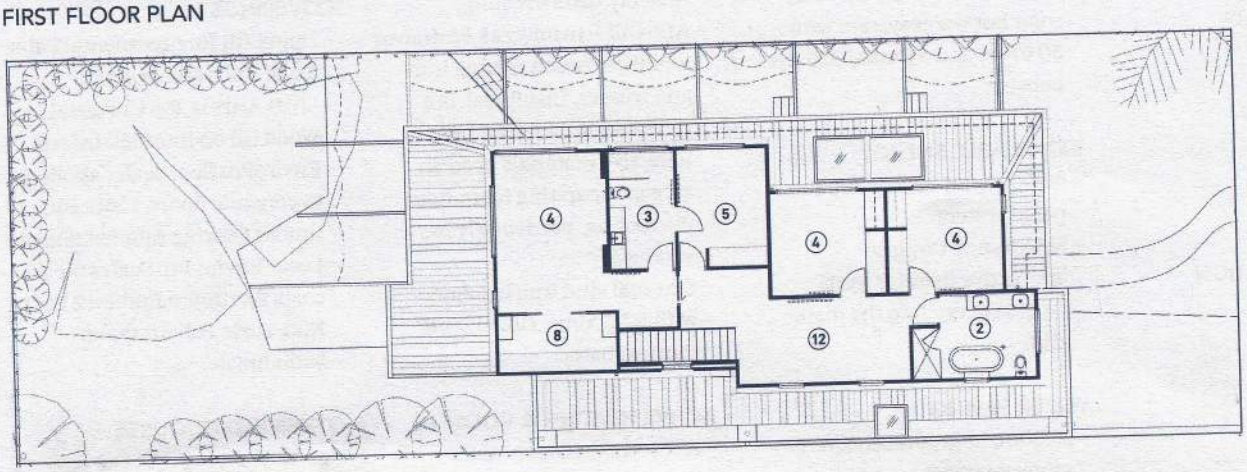
Phase change materials were installed in this west-facing master bedroom's ceiling and walls to help maintain a comfortable temperature in extreme heat. Internal shutters and external shade sails also help keep the heat out.

An open deck runs along the northern and western edges of this Elwood home by Sunpower Design. Adjustable shade blinds and sails can be extended to provide shade when necessary. Bricks from the original structure were reused for landscaping and internal walls.

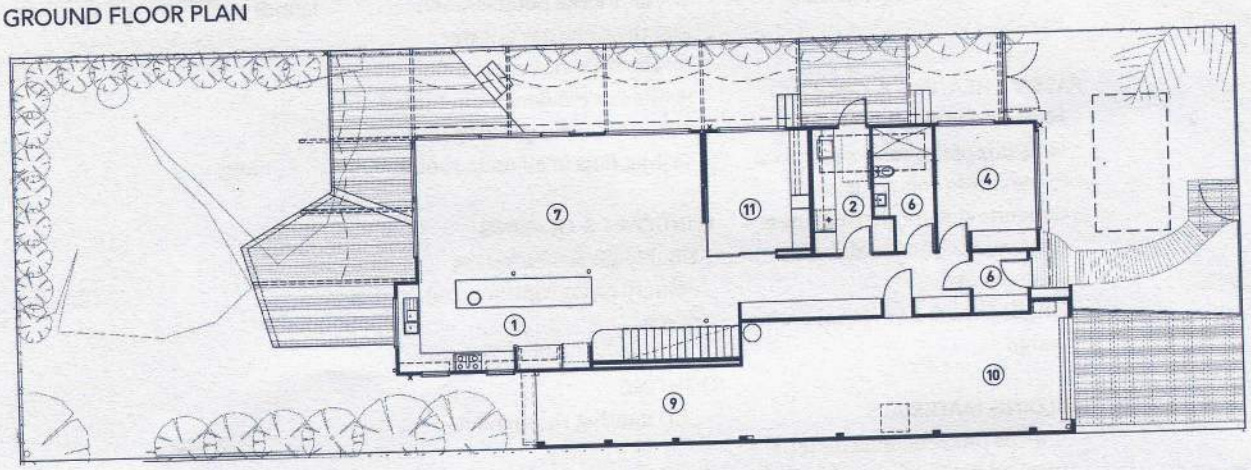
whether it would be more cost-effective to utilise active heating or cooling where and when necessary. In the end the decision to future-proof the home won; extra infrastructure costs upfront would be recouped over and over. In addition, they realised that a suspended slab would provide acoustic benefits to a home busy with children and regular overnight visitors. The floor insulates each level beautifully. "We wanted to be able to enjoy peace and quiet in the various spaces of the home when required," says Tim.

The more subtle design features, even when highly useful are rarely noticed, says Andreas. Few would notice the way the benchtops extend over the cabinets to protect the cupboard doors from food drips, for example. Sustainability too, is in the detail. "We injected foam between frames and structure when installing windows and doors to ensure weatherproofing," he explains. "You can have the best sustainable design but if someone along the way doesn't handle it well you just won't get the results you're after. You only get one shot at doing it well."

FIRST FLOOR PLAN



GROUND FLOOR PLAN



LEGEND

① Kitchen
② Bathroom
③ Ensuite
④ Bedroom
⑤ Study
⑥ Entry
⑦ Living/Dining
⑧ WIR
⑨ Garage
⑩ Workshop
⑪ Lounge
⑫ Rumpus

Elwood house

—Specifications

Credits

DESIGN
Andreas and Judy Sederof, Sunpower Design

BUILDER
Martin Brothers

PROJECT TYPE
New build

PROJECT LOCATION
Elwood, VIC

SIZE
House 268 sqm
Garage 60 sqm

BUILDING STAR RATING
8.2

Sustainable Features

HOT WATER
- Apricus AG-315-SS-26N 315L solar hot water system with 30 tubes and a Rinnai S26 gas booster.

RENEWABLE ENERGY
- 4kW BP grid-interactive solar panel system
- SMA Sunny Boy grid-interactive inverter feeds excess energy into the mains grid.

WATER SAVING
- 25,000L in-ground concrete rainwater tank
- Wattworks Smartpit greywater recycling system for garden use.

PASSIVE HEATING & COOLING
- House oriented north on the long axis of the east–west block to maximise solar efficiency
- Concrete slab for thermal mass, suspended concrete slab to second story
- Detailed cross-flow ventilation design.

BUILDING MATERIALS
- BioPCM phase change material installed in the west-facing master bedroom ceiling and walls. Phase change material adds lightweight, cost effective and highly efficient thermal mass
- Independent Cement's Ecoblend cement to slab
- Recycled bricks from original home used for south internal wall and external paving
- Design Aclad 105 fine sawn white cypress cladding to all external walls
- Recycled spotted gum overlay flooring and stairs.
- Insulation: Two layers of R3.0 AusPoly batts in ceiling
- AIR-CELL Insulbreak 65 draped loosely between roofing iron and trusses. Insulbreak is a reflective material and all reflective materials need an air gap separating them from the roofing, particularly in summer.
- External stud wall insulated with R2.5 Autex Green Stuff thermal batts.

ACTIVE HEATING & COOLING
- Hydrotherm Greenheat hydronic panels, gas operated. It uses the same hot water circuit for the potable water and the same gas booster for the solar hot water unit, leading to efficiencies in capital equipment and gas usage.
- Ceiling fans in all main rooms.

WINDOWS & GLAZING
- Double-glazed Pickering Joinery cedar windows and doors.

LIGHTING
- LED lighting throughout.

CABINET FINISHES
- Kitchen pantry doors are recycled silvertop ash boards fixed to a carcass of E0 laminate board
- All carcases from E0 (zero formaldehyde emission) boards
- Caesarstone 'Snow' benchtops
- Extensive use of recycled spotted gum for cabinets and internal wall cladding in master bedroom – sourced from Urban Salvage in Spotswood.

PAINTS, FINISHES & FLOOR COVERINGS
- Dulux 101 Environmental Paint on all walls and ceilings
- Livos Ardvos 266 Universal Wood Oil on internal timbers
- EnviroPro floor sealer applied to concrete floors, stairs and timber flooring Applied Finish: 1 coat Enviro Pro Sealer then 2 coats Enviropro Endure 2 Pack Non-Toxic Polyurethane
- Satin finish.

OTHER ESD FEATURES
- Clothes drying rack can be elevated to take advantage of warm air near the ceiling of the laundry.