



The light fantastic

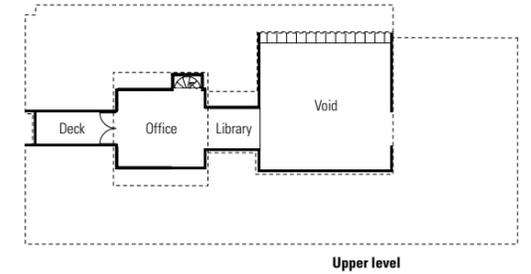
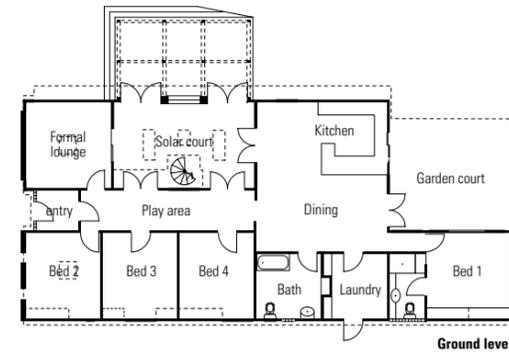
This radiant home proves you don't have to be rich to enrich your environment.

In an age when McMansions dominate the landscape of new suburban housing estates, it's a welcome relief to discover designed for Jan and Cath's Brandjes—in an estate in Sunbury, near Melbourne. This house is proof that comfortable, attractive, sustainable houses are affordable for everyone, even first-home buyers.

Designed by architect Bridget Puszka from BP Architects, the house has been designed to make

the most of the expansive views of the surrounding hills. It is distinguished from its neighbours by its unique roof profile, a reference to the nearby historical buildings of Victoria University.

It's not a large house, only 230 square metres on a block measuring 556, but the space has been efficiently planned so that there is ample room for two adults, three children, a library and an office. Features like the double-height cathedral ceiling in



← High windows upstairs in the library office induce a stack effect which helps exhaust hot air.



the kitchen and dining room, and the glass walls of the solar court, give the house a spacious and open feel.

The front of the house faces west, so the windows overlooking the street have been carefully sized to avoid overheating in the afternoon. The indoor and outdoor living areas are on the northern side of the house for optimal solar access. "Having come from the Yukon in Canada where it is often cold and dark, it was very important for us to have lots of natural light," says Jan.

Eaves shade the northern windows in summer, and the indoor sunroom has three double-glazed argon gas filled skylights that can be opened, and

are protected by reflective solar film. A solar pergola has angled overhead slats to cut out the strongest sun and maximize the space for outdoor dining. All the external windows and doors have been double-glazed. "Double-glazing is not the most affordable part of your home, but I think it's worth the money. You can sit close to the glass in winter and not feel cold, and good glazing reduces your energy costs," says Jan.

To control the cost of double-glazing, Bridget assessed the placement and function of all windows to see if they required double-glazing. "All windows require insulation or covering to stop heat transmission and heavy drapes and pelmets is

another way to insulate windows," says Bridget.

Living in energy-efficient houses is not a new experience for Jan and Cath who have strong commitment to sustainability principles. A builder himself, Jan says, "The three most important things to get right are passive solar design, good insulation, and sealing the building envelope".

"Putting in adequate insulation is relatively cheap, and one person can 'seal' your house in half a day at a cost of about \$300," says Jan. By sealing, Jan means blocking up all the cracks, gaps and holes in the building that admit draughts and let heat escape. This process can take a tradesperson just half a day for a cost of about \$300. 📌

“Once built, passive solar design is free, putting in adequate insulation is relatively cheap, and one person can ‘seal’ your house in half a day at a cost of about \$300.”

Indoor and outdoor living areas on the northern side of the house capture the sun's light and warmth.



The solar court is a warm and light dining area during the cold Melbourne winter.



Jan says that over the course of an hour, enough air will move in and out of a typical Victorian house to completely refill it six to nine times. “To be healthy, a house only needs one-third of an air exchange per hour, which means that most houses are losing far too much energy,” he says.

Because the house is so well sealed, a mechanical ventilation system was installed to ensure good indoor air quality and low humidity levels when the house is closed up in winter. The system has a heat exchanger which draws heat from stale air exiting the house, and uses it to warm up the incoming fresh air, with an estimated heat recovery rate of about 80 per cent. A filter removes airborne particles.

The mechanical ventilation system is not the only safeguard against poor air quality. During construction, building products with low volatile organic compound (VOC) levels were used wherever possible, including non-toxic paints, sealed timbers and fully sealed laminates. “It is important in a well sealed house that you use materials which have low or no VOC content to prevent the build up of chemicals in a newly constructed or renovated home,” says Bridget.

The floors are ceramic tiles for easy cleaning and dust removal. In wet areas, good ventilation and laminates have been used to minimise mould growth. Lastly, a central-ducted vacuum system was

installed to prevent recirculation of dust particles.

In summer, the external and internal doors of the living areas are opened to expand the available space and allow for good cross-ventilation. **High windows upstairs in the library and office induce a stack effect which helps exhaust hot air.** Good insulation levels and good design mean that no cooling systems are needed during summer at all, except for ceiling fans.

The house for Jan and Cath was one of 22 in their estate that received free solar hot water systems and photovoltaic panels, in a move by the estate's developers, VicUrban, and the Victorian and Commonwealth Governments to promote

The photovoltaic panels generates about one quarter of the household electricity.



The unusual roof profile, a homage to nearby historical buildings.



sustainability and renewable energy. The gas-boosted solar hot water system has been installed on the north-facing roof above the kitchen in order to be close to the bathroom, the most frequent draw-off point to avoid heat loss from long lengths of piping. Beside it is the grid-connected photovoltaic array, which generates about one quarter of required household electricity.

Thanks to the passive solar design of the house, the active solar systems and the family's awareness of everyday energy conservation, **the yearly gas & electricity energy bills add up to a measly \$400, about one-third of the amount they were using in another house in the same suburb.** The house has

rainwater tanks and a grey-water recycling system, which lowered their annual water consumption to less than half that of the average Melbourne household.

The house has been used as a showcase for sustainable design. Already, many other residents-to-be have been shown its features and design aspects, and the owners have opened the house to the public for events like Solar House Day. The message that they want visitors to take away with them is simple: with smart design you can build a healthy, beautiful and affordable home. "Sustainability isn't just for the wealthy, says Jan. "Everyone can do it." ❏

- Designer:** Bridget Puszka
- Builder:** owner builder
- Location:** Sunbury, Victoria
- Key Features:** Solar court
 - Double-glazed and clerestory windows
 - 5,000 litres rain water tanks
 - Solar hot water
 - Gekko grey-water system
 - 1.6kW Grid-connected photovoltaic power system:
 - Air filter and ventilation system

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