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## Tour sheet

### West Brunswick Sustainable House

March 2009



The West Brunswick Sustainable House is a Californian Bungalow style weatherboard house built in 1929. It is home for Stuart McQuire and Wendy Orams and their two daughters. Without renovating or rebuilding, the house has progressively been given a green makeover for environmental sustainability. The West Brunswick Sustainable House has gained a national and international profile for its role in pioneering environmental technologies and sustainable living.

The house is set in a permaculture style garden and features grid connected solar electricity, solar hot water, rainwater tanks, water recycling, composting and chooks. There is also an office in the converted bungalow out the back.

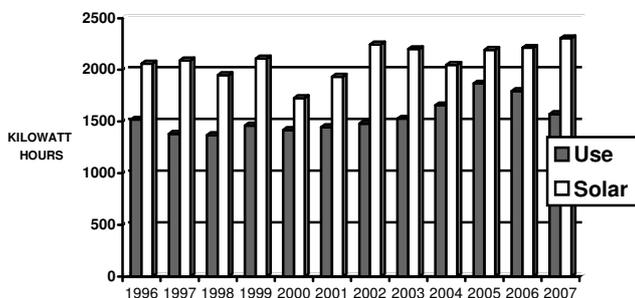
Compared to the typical Melbourne home the West Brunswick Sustainable House demonstrated the following savings in 2005:

- >100% less electricity (10<sup>th</sup> consecutive year of solar surplus!)
- 92% less greenhouse gas emissions
- 97% less mains water
- 63% less natural gas
- 73% less discharge to the sewer\*
- 90% less waste to landfill\* (\* denotes estimated)

#### Solar electricity & energy conservation

The house has generated more electricity than it has used since April 1996 when it became the 1<sup>st</sup> grid connected solar house in Victoria and 2<sup>nd</sup> in Australia. From the street you can see the solar electricity panels on the roof. There are 24 x 83 watt panels, making an array of about 2 kilowatts. They take up an area ~18m<sup>2</sup>. The roof faces north and has a pitch angle ~29 degrees.

ELECTRICITY CONSUMPTION AND GENERATION



Walk up the driveway to the meter box beside the house. The grid connected solar panel system feeds the surplus electricity back to the grid. The inverter converts the solar DC electricity to AC and 240 volts. This means no special wiring or appliances are needed

in the house. There are no batteries, but the meters record the surplus electricity.

#### Solar hot water

Walk up driveway to the back yard. The solar hot water unit is mounted on a frame on the roof to face the sun.

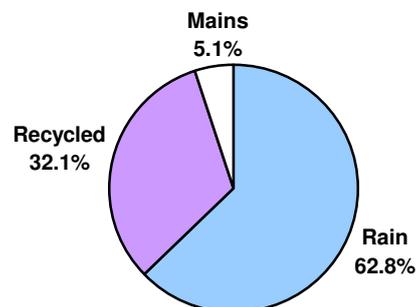
- electric hot water previously used 2/3 of our overall electricity.
- Solar/gas unit cuts greenhouse by around 5 tonnes per year.

**Greenhouse gas from electricity & gas has been cut by ~90%. Previously ~10 tonnes per annum, now <1 tonne.**

#### Water use

Mains water is now only used for 2 taps, the cold tap in the kitchen for drinking & cooking and the cold tap in the bathroom for brushing teeth. Mains water consumption is down to about 4 litres per person per day- ~97% less than the typical Melbourne house. Overall water consumption in 2008 was ~110,000 litres, with proportions as shown in the graph.

WATER CONSUMPTION BY SOURCE (2008)



- We received a Smart Water Fund grant to install new water recycling and rainwater systems (2003-5).

#### Rainwater system

- The rainwater system uses four rainwater tanks to store up to 20,000 litres of water (one 6800 litre & three 4500 litre tanks).
- A pump automatically provides pressure when a tap is turned on. The rainwater system also has a device that switches across to mains water supply automatically if the rainwater tanks run low. The rainwater is now used for showers (hot & cold water), hot water, laundry and 3 taps in the garden. Previously rainwater was used in laundry, toilet flushing & garden.
- Guttering & roofing have been upgraded to improve the water quality. First rain diverters have also been fitted. The guttering has 2 levels & uses filters to screen out leaves. The 1<sup>st</sup> rain diverter contains a ball that floats up after the 1<sup>st</sup> bit of rain has been captured for diversion.
- Around the side of the house near the large rainwater tank you can see the water pump and the 'Rainbank'

that automatically switches from rainwater to mains water.

### Water recycling:

- The water feature in the front yard is part of the water recycling system.
- The Envirowater water recycling unit uses a tank underground (beneath the pebble bed) to receive water from the shower, bathroom basin and laundry, which it then processes in batches using mineral and biological filters.
- The treated water is then disinfected using ultra-violet light, before being pumped into large storage sacs which resemble water beds under the house. Recycled water is automatically pumped from the sacs when the toilet is flushed or when one of the recycled water taps is turned on.
- The Envirowater unit treats water to 20/30/10 standard, which means it can be stored and then reused / recycled for toilet flushing and watering the garden (even on the edible parts of plants).
- On the uphill side of the house there is a control unit for the water recycling system mounted on the wall, along with a filter for particles that remain in the water and an ultra violet lamp for disinfection of the treated water prior to storage.
- Under the house next to the driveway there is storage capacity around 11,000 litres for the treated water using two 5,500 litre water sacs. The sacs are each 6m long and are supported by metal frames that fit between the concrete stumps.
- Purple hoses, taps & signage are for the recycled water.
- Previously recycling of laundry, bath & shower water to garden (up to 90,000 litres per year). Simple method using rubber diversion funnel, polypipe and hose. Liquid laundry detergent used to avoid high sodium salt content of powder detergent. Water recycling from the shower/bath & laundry cut the amount discharged into the sewer by ~80%. This allowed the household to receive a discount of ~\$70 a year from the sewage disposal charge.

### Permaculture garden

- It's a great place to be!
- The plants provide food, so the garden reduces our eco-footprint for food production off-site.
- Fruit & nut trees, along with vegie garden, indigenous & native plants.
- Deciduous trees and vines on the north & west sides of the house allow winter sun & summer shade.
- Mulch on the ground, saves water & improves soil.
- Compost bin with worms recycles food scraps into fertiliser.
- Chooks recycle food scraps & garden organics into eggs & fertiliser.
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### Inside the house bathroom

- Water & energy efficient shower rose (<7 litres / minute) cuts (hot) water consumption by >50%.
- Dual flush toilet (6/3 litre) cuts toilet water consumption by > 50%.

### lounge room

- compact fluorescent lighting
- gas heating zoned to living areas
- insulation
- turn off appliances at the wall

### kitchen

- Energy efficient appliances (medium size fridge)
- Gas cooking
- Recycling containers (for paper & cardboard and bottles & cans)
- Compost containers (for compost & chooks)
- Manual dish washing

### laundry

- Front load washing machine (less energy, less water, gentler on clothes)
- Cold water clothes washing (saves ~ 90% energy compared to hot water)
- Clothes rack for indoor clothes drying in wet weather (avoids need for electric clothes dryer).
- Outdoor solar clothes dryer (clothes line!)

### home office

- No commuting to work (saves energy, greenhouse & time).
- Energy saving software activated on computer.
- Inkjet printer uses less energy than laser printer.
- Switch off power at night.
- Recycled paper used in office (saves energy, greenhouse & trees).

### Renovation

- Plans were made to renovate the rear of house so that it would have a kitchen & dining area opening to the garden. The plans included passive solar features - north facing windows and thermal mass. The potential is there, but the plans are on hold (saving ~\$100k).

### Approximate costs:

- Solar electricity from <\$1000 after rebates.
- Solar hot water \$4000 to \$6000, less \$1500 rebate.
- Envirowater unit: ~\$7000 (+ installation ~\$3000 to \$5000).
- Rainwater tanks: ~\$1000 (5000 litre).
- Water storage sacs: ~\$2500 (5000 litre).
- Pumps: \$300 - \$600.
- Rainbank: \$600.
- Enviroflow guttering: \$30 metre.
- Rubber diversion funnel: \$7.
- 3 star shower rose: \$20.
- 4 star dual flush toilet: \$250.
- Water efficient washing machine: from ~\$700.
- Medium size fridge: from ~\$700
- Compact fluorescent lights: from ~\$5.

Please sign our visitors book. **Thanks for coming.**

### For more information

Contact Stuart McQuire: Phone 9018 9720  
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See [www.greenmakeover.com.au](http://www.greenmakeover.com.au)