

FACT SHEET



RENEWABLE

ENERGY

SOLAR ENERGY

AUSTRALIA IS BLESSED WITH ABUNDANT SUNSHINE SO IT MAKES SENSE THAT WE DESIGN OUR HOMES TO MAXIMISE THE BENEFITS OF THIS INCREDIBLE RESOURCE. AT JOSH'S HOUSE, SOLAR ENERGY IS BEING UTILISED IN A NUMBER OF WAYS, INCLUDING PROVIDING HEATING, NATURAL LIGHTING, HOT WATER AND ELECTRICITY.

SOLAR PASSIVE DESIGN

The houses are based on well-established solar passive design principles to ensure maximum thermal comfort year round, with no air-conditioning or artificial heating required. These include:

- East-west orientation with maximum glazing to the north for winter solar gain (shaded in summer) and minimal glazing to the east and west to minimise unwanted summer heat entry.
- High thermal mass materials used on the inside of the buildings to absorb winter solar gain and stabilise internal temperature during summer.
- High insulation value to roof and walls to minimise uncontrolled heat loss/gain, and pelmeted curtains on the windows to reduce heat loss in winter.
- Living areas located on the northern side of the home which are the warmest during winter.



NATURAL DAY-LIGHTING

The houses have been designed to feel light and airy in their layout and operation. High ceilings, wide hallways and doors, as well as light coloured walls, ceilings and drapes all add to this effect. The windows have been thoughtfully positioned to let in natural daylight without being exposed to unwanted summer heat gain. Because the homes are only two rooms deep, principally to allow for effective cross ventilation for summer cooling, the only areas that don't receive direct sunlight are the hallways, walk-in-robos and toilets. Here 'Solartube Skylights' are used to provide natural day-lighting, eliminating the need for artificial lighting during the day. These devices have a lens on the roof that captures and directs sunlight through the roof cavity via a reflective tube to a decorative fitting mounted in the ceiling. Even in the late afternoon, it's amazing just how much natural light fills these spaces so that lights can be left off until nightfall.



PHOTO-VOLTAIC SYSTEMS

Generating electricity from roof mounted solar panels has become very popular with an increasing number of options available on the market. The approach at Josh's House was to maximise energy efficiency through good design and technology choices in the first instance, then size a system that would cover slightly more than was actually needed so that the homes would be net energy exporters.

The system selected was made up of a 3 kW solar array, paired with a 2.5 kW transformer based inverter. Whilst it may seem unusual for the maximum panel output (kW of DC) to exceed the maximum inverter capacity (kW of AC), the rationale from the system designers was that the 2.5 kW inverter only produces 30 kW less per year, or \$7.20 less revenue, than the 3 kW inverter. The saving on the smaller inverter is approximately \$350 which could be put towards other energy and water saving features.

The solar panels are REC 250w poly silicon panels, using a locally made aluminium rail system, with no anodising. These have a one year energy payback for the entire manufacture, assembly and decommissioning process. The inverter is a transformer based 2.5kW Power-One Inverter.

Supplier: www.infiniteenergy.com.au

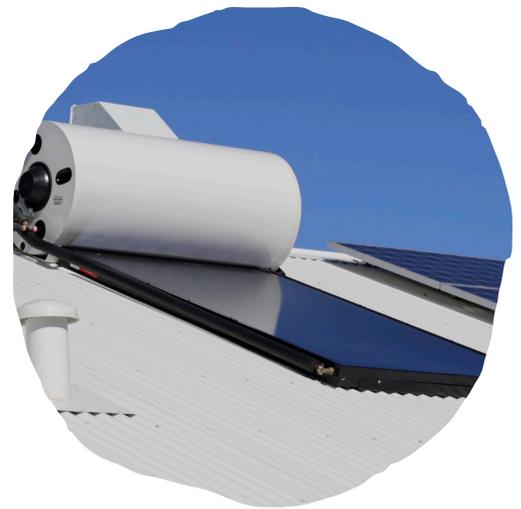
SOLAR HOT WATER SYSTEM

Like solar photovoltaic panels, solar thermal hot water systems have become increasingly popular. For Josh's House, the system selected was the Chromagen PKT 000 300 litre thermosiphon 'open loop' panel, with a roof mounted tank and an in-line T20 roof mounted instantaneous gas booster. The advantage of this arrangement is that there is minimal heat loss between the panel, tank and booster unit. Having the booster mounted on the roof also means that it can be centrally placed to evenly service the wet areas where hot water is used, minimising the amount of time taken for warm water to be delivered, which also prevents water being wasted whilst waiting for it to heat up.

Supplier: www.chromagen.com.au

PERFORMANCE MONITORING

Detailed performance monitoring of Josh's House will soon get underway as part of a three-year research project through the CRC for Low Carbon Living. The research project, run in conjunction with the Curtin University Sustainability Policy Institute (CUSP), will assess the thermal performance of Josh's House, as well as the energy and water use efficiency of the homes and landscaping. Data will be shared with industry and the broader community to help further the understanding and opportunities of cost effective sustainable housing design. For more information, download a copy of the Performance Monitoring Plan.



FOR MORE INFORMATION, VISIT WWW.JOSHSHOUSE.COM.AU

