



LIVING GREEN

Going green is not only mandatory in most state building codes; it makes sense if you're doing a significant renovation. So what does it take to make your home a green one?

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The most important aspect of a successful green home is its building envelope. The building envelope includes the roof, walls, windows and floors. Next comes water and energy efficiency, based on the type of appliances and equipment you have and how they are used.

Paying careful attention to these crucial components can result in reduced energy bills,

Above Coledale Beach House by Designing Green was created using passive design principles. designinggreen.com.au

a more comfortable internal environment and a reduced environmental impact.

PASSIVE DESIGN

A passive-designed home does not rely on mechanical cooling and heating. Its success

is governed by correct orientation and the components of its building envelope.

Passive solar heating

A home designed with passive solar heating in mind keeps summer sun out and lets winter sun in. It is dependent on factors such as:

- Effective shading of glass and windows.
- Insulation to minimise heat loss and gain.
- Sealing gaps around doors and windows to keep heat in.
- High-performance glazing positioned correctly, to maximise heat gain in winter and reduce it in summer.
- Floorplan zoning to trap heat in areas where it is most needed.

Passive cooling

Passive cooling is achieved through cross ventilation. In layman's terms, it means opening and closing windows that are positioned correctly to take advantage of cool breezes during the hot summer months.

Insulation

Insulation is essential to the success of passive design. It improves the performance of the building envelope by minimising heat loss and gain through walls, roof and floors. Different varieties are available. When making your selection, consider the recycled content and recycling ability of the product.

Thermal mass

Building materials such as concrete, bricks and others are used in passive design to store and release heat absorbed from the sun. This is called thermal mass and can create a temperate internal environment, reducing energy use.

Windows/glazing

Most heat loss and gain occurs through windows. High performance glazing positioned correctly can trap heat in winter and reduce it in summer.

Shading

Shading of windows and glazing is crucial to a well-insulated home. Correct shading of a home is dependent on the climate, its inhabitants and its orientation.

Skylights

Skylights can be used to add natural light in dark areas. They can also assist in increasing the thermal mass performance of a home by trapping heat during winter.

ALTERNATIVE CONSTRUCTION METHODS

Materials used in the construction of a home

contribute greatly to its eco success. It pays to consider alternative solutions that will increase internal thermal comfort, lower construction and maintenance costs and reduce energy bills.

Mud bricks (also known as adobe)

Basic mud bricks are made from a mixture of earth and water. The mixture is poured into moulds and dried naturally. Fibres such as straw are added to reduce cracking. Bitumen is included as a stabiliser and a moisture repellent. Mud bricks can be left in their natural state or can be painted.

They are structurally sound, provide effective thermal mass and are fire and pest resistant. As they are dense and do not effectively trap heat, additional insulation may be required to increase performance in certain climates.

Rammed earth

Rammed earth walls are constructed by ramming a mixture of aggregates, including gravel, sand, silt, clay and cement, into layers between flat panels, called formwork.

Rammed earth provides some insulation and excellent thermal mass. It has superior strength and durability, and is low maintenance, with no need for painting. It is also pest and fire resistant.

WATER AND ENERGY

A well-performing building envelope will allow the natural integration of energy- and water-saving techniques. This is essential to further reduce the environmental impact of a green home.

WATER EFFICIENCY

Simple changes in the way you use water can reduce water bills. Start by choosing water-efficient products. Australia has a Water Efficiency Labelling and Standards (WELS) Scheme, which rates the efficiency of taps, showers, toilets, washing machines and dishwashers. The more stars on the label, the more water efficient the product.

Ensure all taps and showerheads have high WELS ratings. Install WELS 3- or 4-star rated dual-flush toilets to reduce water wastage.

Rainwater

Rainwater tanks can provide sole or supplementary water supply. Rainwater is ideal for toilet flushing, in laundries or for watering the garden.

Greywater

Depending on local government regulations, greywater from showers, basins and taps can be used to flush toilets, water the garden and even



Above Red Hill designed by architect Gregory Burgess. Built By Earth Structures from stabilised rammed earth. earthstructures.com.au

Above right Madin Fireplace designed by architect Sally Draper. Built by Earth Structures from stabilised rammed earth. earthstructures.com.au

to wash clothes. A variety of greywater systems are available to suit varying needs.

Stormwater

Stormwater is the term given to rainwater and anything the rainwater carries with it. It can be redirected and reused in gardens through planting vegetation, such as deep-rooted trees, maintaining the topography of your block to keep its natural drainage pattern, and providing permeable surfaces such as pebble paths and permeable paving.

Outdoor water use

Up to 60 per cent of household water is used outdoors. To conserve water, minimise lawn areas and replace them with groundcover plants or mulched garden beds. Plant

Australian natives and succulents that use less water. Improve soil, water retention and drainage with fertilisers, gypsum and sand.

ENERGY EFFICIENCY

The average household's energy use accounts for more than seven tonnes of greenhouse gas emissions. These emissions can be significantly reduced through efficient appliances and energy conservation.

Photovoltaic cells

Photovoltaic cells (PV) generate electricity when exposed to sunlight. Grid-connected PV systems can be supplemented with mains electricity and return surplus power back into the electricity grid, making you money.

Stand-alone PV systems are more common in remote locations with no connection to mains electricity. They are installed with a battery bank, inverter, battery charger and a fuel generator for back-up supply.

PV panels should be installed in locations to maximise solar radiation and minimise shade.

Frames can be fixed, adjustable or mounted on tracks to follow the sun's path.

Hot water systems

Hot water accounts for about 25 per cent of household energy use. Choose the most efficient system to suit your needs.

Solar hot water works with both gas and electricity connections. Water is heated in a rooftop solar panel and piped into your hot water service. On cloudy days, it can be supplemented with gas or electricity services to ensure a constant supply. Gas-boosted solar hot water is the cheapest and most eco-friendly form of water heating.

Heating and cooling your home

Gas heaters and airconditioners have energy rating labels to help you choose the most energy-efficient system to suit your needs. The more stars on the label, the more efficient the system.

- Ceiling fans are a great alternative to airconditioning systems.
- Using passive design principles can increase



Above Yarra Valley Tarrawarra designed by architect Alan Powell and Irwin Alsop Group. Built by Earth Structures from stabilised rammed earth. earthstructures.com.au

comfort and minimise the need for heating and cooling.

Electrical appliances

When purchasing white goods and small appliances, look for the Energy Rating label to help you make your selection. A larger model will use more energy than a smaller model with the same star rating. Choose appliances with energy- or water-saving features, such as washing machines with cold water cycles, 'eco' cycles and load size options. Dry clothes on a line rather than in the dryer.

Switch off appliances at the wall to reduce stand-by energy consumption when not in use.

Lighting

Using the right globes can make a huge difference to energy consumption. Simple things, such as turning off lights when not

needed, will significantly save on energy bills. Other ways to reduce consumption include:

- Using fluorescent or compact fluorescent lamps. They are more energy efficient than low-voltage downlights and last longer.
- Timers or sensors on outdoor security lights.
- Solar lights for outdoor areas.
- Use the minimum wattage lamp indicated on fittings to reduce energy consumption.

QUICK GUIDE

Design

- In Australia, a house should have a north-facing aspect to maximise shade in summer and sun in winter.
- A light-coloured roof reduces heat absorption in summer.
- Insulation to ceilings, floors and walls creates a temperate internal environment.
- Shading well-placed windows reduces sun in summer and increases sun in winter.
- Install energy-efficient glazing to minimise summer heat gain and winter heat loss.

Water use

- Manage water usage through star-rated showerheads and taps and dual-flush toilets.
- Rainwater tanks can be connected to toilets, laundry and garden.
- Increase size of stormwater and rainwater tanks.
- Increase amount of roof area diverted to water tanks.
- Gas-boosted solar hot water system is the most energy efficient.
- Native vegetation reduces the need for regular watering.

Energy use

- Use solar, gas hot water systems or an electric heat pump hot water system for less energy use.
- Install ceiling fans and reduce airconditioning.
- Select high-efficiency airconditioning systems.
- Install energy-efficient light fittings.
- Dry clothes outdoors.
- Install pool and spa pump timers.