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Agriculturally rich–Naturally beautiful

ENERGY EFFICIENT HOMES	IS021
	Responsible Officer: MDS
	Issue Date: 25/07/2011
	Next Review Date: June 2018

Do you want a comfortable home which doesn't cost the earth? Houses built using energy efficient design principles cost little or no more to build and much less to heat and cool, compared with houses not built this way.

With the current pressures on energy resources, rising living costs and the harsh Australian climate it makes sense to design housing to minimise energy use. There are several simple principles for energy efficiency. These include:

- Energy efficient homes are well insulated to keep the outside climate from getting in;
- North facing living areas with eaves shade windows in summer but allow winter sunshine in; and
- Solid material, like concrete floors and internal brickwork, help even out temperature changes by taking up and letting go heat slowly.

There are four broad areas for you to consider when building a new energy efficient home; site selection, layout and window position; materials and insulation; sun shading and landscaping; and occupant behaviour.

Site Selection, Layout and Window Position

When designing an energy efficient home it pays to start from the ground up. This means selecting the right block and putting the house in the right place on the block.

The orientation and layout of your home can make a huge difference to your energy bills.

The ideal home is sited with the living areas facing north and with its long axis of the house running east-west. Large amounts of glass on the north facing wall will let sun into the house in winter, while eaves of the correct width will shade the house in summer.

To make the most of a site's potential for 'solar access', a site analysis should consider:

- The movement of the sun across the site;
- The shadows from surrounding buildings; and
- The location of all nearby existing and proposed trees.

The main living areas (family room, kitchen, lounge and dining areas) are best placed on the warmer side of the house, facing north. The south side of the house is cooler because it receives no direct sun light therefore bedrooms on this side will be more comfortable for sleeping. Grouping living and sleeping areas on different sides of the house allows you to create 'zones'. With doors fitted between these zones it is possible to close off areas that are being heated/cooled or not being used.

Windows perform very important functions. They can let light and heat into a house as well as provide ventilation when opened. The best sizes for windows depend on which direction they face, how they will be shaded, the type of floor and wall construction, and the size of the house.

North facing windows let the warming winter sun in for much of the day. They are easy to shade from the hot summer sun with wide eaves or pergolas.

South facing windows should be large enough to allow good ventilation and daylight in, but not so large that these rooms lose a lot of heat during winter.

East and west facing windows are hard to shade with eaves and verandahs because the sun is near the horizon in these directions. East and west windows are best kept small and should be fitted with shutters, outside blinds or shading such as lattices, trees and shrubs.

Material and Insulation

Heavyweight building materials – such as concrete slab floors, solid brick, concrete blocks and stone absorb heat during the day and release it at night. A house built of these materials, with high 'thermal mass' is slow to heat up, while a house made of lightweight materials heat up quickly. These characteristics can be put to good effect when considered in conjunction with appropriate glazing and insulation. To be most effective, materials having a high thermal mass should be located within the insulated area of the house in north facing rooms.

Insulation is the single most important factor in ensuring that a house can be heated and cooled economically. Generally, bulk and reflective foil laminate insulation of both walls and roof will be required. **Good siting of a house taking advantage of access to the northern sun can greatly benefit the affect of insulation.**

Sun Shading and Landscaping

Well designed shading adds greatly to the energy efficiency of your home. Good shading keeps sun and heat out of your home in summer and lets it in during winter. There are many different methods of shading, including; eaves, verandahs, awnings and shutters, pergolas and landscaping. External shading methods are more effective than internal shading.

Landscaping around a house plays an important role in energy efficiency. Deciduous trees and vines grown on a north facing verandah will provide shade in summer and let the sun shine in during winter. Evergreen trees are best located to the west and east of a dwelling to protect rooms from early morning or late afternoon sun.

Careful landscaping design can provide shielding from winds, deflect cooler summer breezes into the house, reduce glare and generally modify temperatures at all times of the year.

Occupant Behaviour

However energy efficient your home may be, the most significant factor is you. The way you and others use your home will determine how comfortable you are and how big or small you energy bills are. Some simple initiatives will enable you to facilitate further energy efficiency through common sense behaviour. Some of these include:

- Space heating and cooling and hot water are the big energy users in most homes. Wear appropriate clothing that will reduce the need for heating and cooling and keep you comfortable.
- Choose appliances that have high-energy efficiency ratings.
- Heat or cool only those parts of the house that are being used.
- Switch off lights, heaters, air conditioners and other appliances when they aren't in use.
- Make up full loads and use cold water when you wash clothes.

- Set heater thermostats to no more than 20°C and cooler thermostats to no less than 25°C which will keep you comfortable without costing the earth.
- Keep filters, coils and radiator surfaces clean so appliances can operate efficiently.

Further Information

The Department of Planning, Transport and Infrastructure has detailed information on all aspects of energy efficiency available on their website: www.dpti.sa.gov.au/planning

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