



Fact Sheet No. 14

DESIGNING AND BUILDING A NEW HOUSE

Did you know that an energy-efficient house could use 90 per cent less energy than one designed conventionally?

Being energy-efficient is part of a bigger picture, that is, 'ecologically sustainable development'. This means taking care of our planet: conserving scarce and valuable resources, ensuring the health of all living creatures and valuing and caring for our natural environments. When we talk about 'ecologically sustainable development' we mean using resources, building cities and factories, producing goods and changing environments in ways that are not threatening to our survival and our planet.

The majority of homes in urban areas of Australia use energy from one or two sources: electricity and gas. Energy is used in three main ways: to light our houses, to run appliances and to heat or cool living

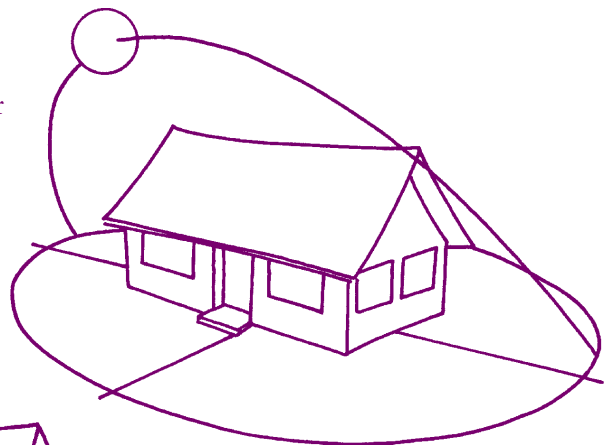
areas or water. These energy sources are fairly inexpensive in economic terms, that is, in dollars spent by the consumer, and in costs to the community to establish power stations. Both of these sources have negative impacts on the environment. The negative impacts occur at the sites where they are extracted from the earth, and at the power stations where they are burned to produce electricity.

In Australia we use somewhere between 10 and 15 per cent of the total energy we produce in our homes so it is very important we do all we can to be more energy-efficient. If we can make our houses more energy-efficient, it means that we will use less non-renewable energy. Burning less coal and gas will reduce the greenhouse gases released into the environment. We have great opportunities to be more energy-efficient when we design and build new homes. How can new houses be designed to be more energy-efficient?

What's important in house design?

Houses can be designed so that they can be heated and cooled naturally. It can be as simple as trapping the sun's heat in winter to warm the house. A house can also be designed to keep the summer heat out and to use natural breezes to keep the house cool. There are two important things about the sun to remember when designing a house:

- As it rises and sets each day, the sun moves across a northern path in the sky;
- The position of the sun in the sky in summer is higher than in winter.





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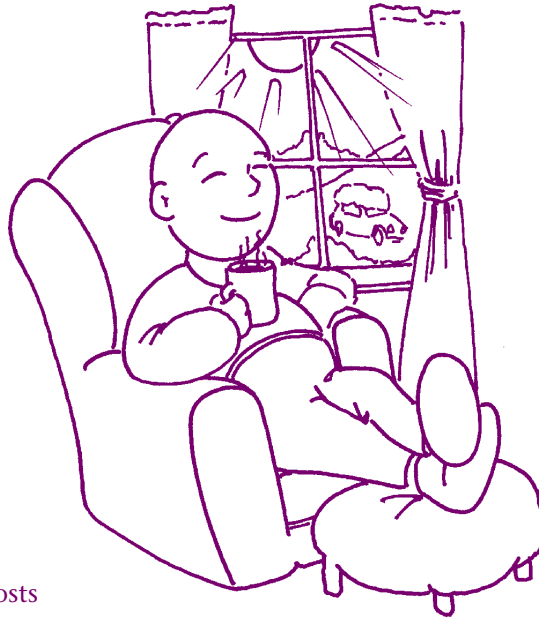


To keep your home warm in winter you can use all these design features:

- Plan as many windows as possible on the northern walls to trap the sun's heat
- Arrange the living areas on the northern side of the house
- Build the internal walls of brick or concrete to absorb the heat during the day and warm the house during the night
- Hang thick curtains to prevent heat being lost through windows at night
- Install insulation in the walls and ceilings to help stop heat loss to the outside

In some parts of Queensland, such as the tropics, winter heating is rarely needed.

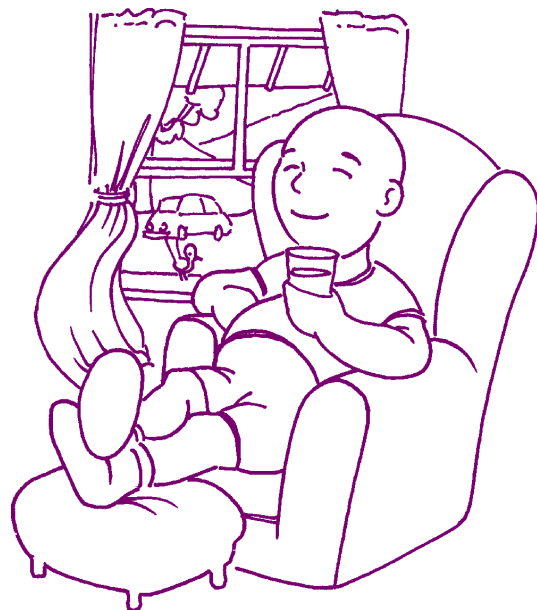
What are the financial and ecological factors – costs and benefits – of these features?



To keep your home cool in summer you can use all these design features:

- Shade the northern windows of the house with eaves, awnings, or a pergola
- Plant deciduous trees on the northern side of the house – when they lose their leaves in winter the sunshine will enter the house and in summer the leaves will shade the house from the heat. Consult your local council and nurseries for suitable trees.
- Shade windows on the eastern and western sides of the house
- Insulate the walls and ceiling to cut down on heat entering the house.

What are the financial and ecological factors – costs and benefits – of these factors?



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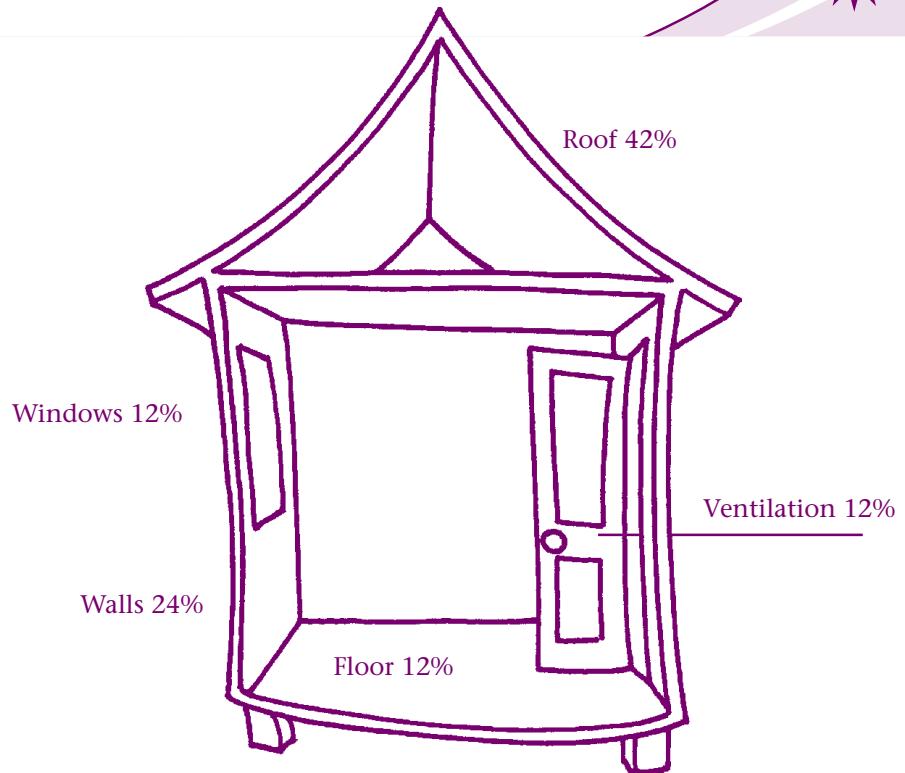
How important is insulation in a house? Very important. Look at these figures. This sketch shows you the approximate heat gains in summer and heat losses in winter in the average uninsulated home. These figures vary according to the season of the year, the construction materials used and the design of the house.

When designing new houses greater energy efficiency can be obtained if the design includes:

- A passive solar design; and
- An active solar design.

A passive solar design uses window size, location and shading, along with the general orientation or direction of the house.

An active solar design involves heating and cooling appliances that use the sun's energy.



Solar energy makes sense in new house designs and for existing houses.

It is possible to provide electricity for a whole house from photovoltaic solar cells – you could even power your television set with solar electricity. ‘Photo’ means light and ‘voltaic’ means electricity. At present it is more expensive in economic, or dollar, terms to install solar cells for electricity, but running costs are relatively low compared to purchasing coal- or gas-fired electricity. The cost of producing solar cells is getting cheaper.

Solar cells can cause environmental damage when they are being made. Silicon is found in the sand and mining such sand can damage local habitats. Also, energy is needed to make the metal, glass and plastic parts of the solar cells.

Apart from some negative impacts of the production of solar cells on the environment, solar energy does make good sense ecologically. Why doesn't everyone install one? What other factors must people take into account?

Some consumers in new or existing homes are installing solar hot water systems. These are different from solar cells. They do not produce electricity but heat the water using solar energy. Again, these solar panels are initially expensive to install but in the long term they are cheaper to run than electric or gas hot water systems. So, economically, solar hot water systems make good sense in the long term for consumers and the community. Ecologically, installing solar panels for hot water supplies also makes good sense.