

Think
Green

ENERGY

Passive Solar Design



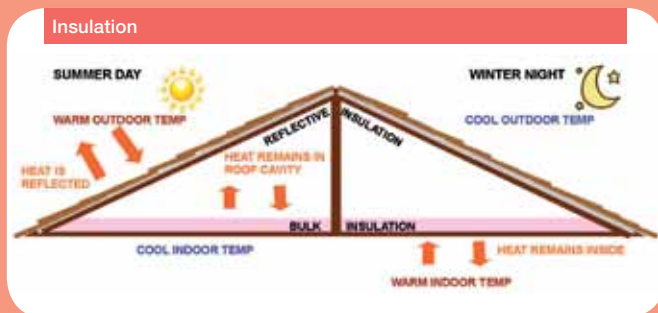
Ventilation

Ventilation works to equalise indoor and outdoor temperatures and remove heat stored during the day. It also cools those living in the house by accelerating evaporative cooling on the skin.

When the cool sea breeze arrives in the late afternoon (from the South-West) open windows on both sides of the house to get the breeze through the whole house.

Similarly, draughts also have a cooling effect and can be minimised by sealing doors and windows. Vegetation can be used to screen cold winter winds from the west.

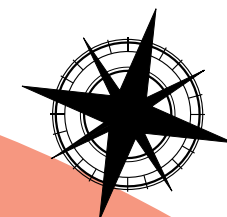
For more information on passive solar design visit *Think Green – Energy* on the City of Joondalup website: www.joondalup.wa.gov.au

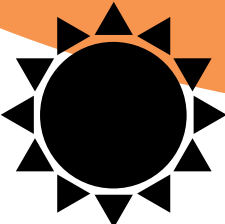


Insulation

Insulation can reduce heating and cooling energy use by 45-55% and will help keep your home more comfortable. Insulation works by resisting heat transfer in and out of the home. There are two main types of materials used: bulk and reflective. Bulk insulation uses small pockets of air to resist heat transfer and is applied close to the ceiling. Reflective insulation reflects heat and is applied close to the roof or in walls.

R-values refer to the thermal resistance of insulation products. In Perth, an R-value of 4.1 is recommended for roofs and 2.8 for walls.





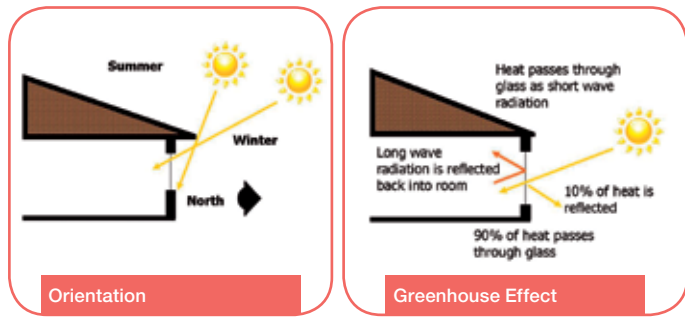
Passive solar design makes homes more comfortable all year round and reduces the need for artificial heating and cooling. Although passive solar design is easier to implement in new homes, the principles can be used to make existing homes more energy efficient.

Orientation

Living areas are best located on the northern side of your home because it is the most comfortable all year round. It may not be possible to change the orientation of existing homes; however, north facing areas can be used to increase heat gain in winter and reduce it in summer.

Large windows on the northern facade will allow low angle winter sun to warm the house. With appropriate shading, high angle summer sun can be blocked.

East and west facing windows should be kept to a minimum and fitted with external vertical shading to block morning and afternoon sun in summer.



Zoning

Zone rooms with similar thermal requirements together to make heating and cooling your home more efficient. Living areas, family rooms and kitchens are the most used rooms and are ideally located north. Bedrooms and bathrooms should be located on the south or east facade as they require only personal heating and cooling. Garages and other less utilised rooms are best located on the west side of the house.

Group wet areas such as bathrooms, laundries and kitchens together to minimise heat loss from hot water systems.

Greenhouse effect

Windows trap heat in your home much the way that glass does in a greenhouse. Up to 90% of heat energy from the sun passes through glass. The heat enters your home as short wave radiation, however, once it has been absorbed by materials and re-radiated back into the room it changes to long-wave radiation. Heat in this form cannot pass through glass and is therefore trapped inside your home.

The best way to prevent heat transfer is to shade windows from direct sunlight. External shading is far more effective than curtains at reducing heat gain through windows.



Thermal Mass

The ability of building materials to store heat is referred to as its thermal mass. Materials high in thermal mass include brick, concrete, clay, tiling, granite and other masonry. Thermal mass is best used on the northern facade where heat can be stored and released gradually to warm the house.

Dark internal flooring will absorb heat in winter when the sun is low but is unsuitable for outdoor areas and roofs that will absorb heat in summer. Lighter colours reflect heat and are appropriate for roofing, external walls and paving.

