

# Making the most of glass and thermal mass



Sustainable design and build

To maximise the benefit from winter sun, homes in Tasmania should be designed to permit sunlight to enter large north facing windows and warm the building's interior. Although winter sun may feel quite weak when compared with summer sunshine, once inside a purpose designed building, it can provide much or all of its heating needs.



To understand why, it's important to understand the 'Green House Effect'.

The sun's energy arrives as a part of the electromagnetic spectrum that we usually refer to as visible light.

Visible light passes easily through glass and once inside your home it heats any surface it shines on.

As it warms, the inside of the house re-radiates this accumulated heat. Because it is cooler than the sun, this radiant energy is from a different part of the electromagnetic spectrum, invisible light with a longer wavelength, often referred to as infrared.

Although the shorter, visible wavelengths of light pass easily through glass, these longer, invisible wavelengths do not.

Glass appears opaque to infrared and so acts as a kind of one way valve.

Once the sun's warmth enters through a window, it's trapped behind the glass and this is the reason why green houses can be warm on a cold day, why a car can become uncomfortably hot in bright winter sunshine and, as some gases behave a little like glass, why 'green house gases' are causing the earth's temperature to rise and promote change in our climate.

Using the sun to provide free heat is simple common sense but it does have one major drawback: it's not available at night or on rainy or heavily overcast days.

To compensate for this erratic supply of warmth, heavy materials that can store this heat need to be incorporated into the fabric of the house.

Bricks, concrete, stone and mud brick are all examples of heavy building materials that can store large amounts of heat and can be considered 'Thermal Mass'. This is the reason why old, solid brick or stone buildings can feel cool on a hot day and, once warm, will stay warm long after the fire has gone out.

Any sustainable, passive solar house must have an appropriate amount of these heavy materials in order to preserve heat and avoid big swings in temperature.

Besides being placed to frame or capture a view, the other great benefit that windows bring to a sustainable house is natural light, not only quantity but also quality.

Natural light should be even but interesting and reduce the glare often associated with the big, north facing windows required for heating.

**For free advice about these important issues, call us today on (03) 6227 9633.**