

In the midst of a summer heat wave it is unlikely your mind is going to heating and the thermal efficiency of your home. But while the sun shines it is a good opportunity to look at how the design of your home can greatly enhance the performance of your living spaces.

In this month's *ESD Matters* we look closely at passive solar design. We explore how simply thinking about all the surfaces in a design can make your house significantly more comfortable and reduce your heating costs.

Passive solar design refers to the use of the sun's energy directly for the heating and cooling of living spaces. The building itself uses the natural characteristics of materials and air to take advantage of the sun's energy.¹ Even on a cloudy day the sun's energy will reach our homes and whilst a downside is faded fabric on your favourite arm chair, there is much to be gained at the same time.

When it comes to designing your home for maximum benefit, there are a few simple principles to keep in mind:

- Light colours reflect radiation, whilst dark colours absorb (unless a reflecting additive has been used)
- The capacity of a surface to reflect, absorb or transmit solar energy depends on its density and composition. Concrete, earth and water are effective for absorption and storage of heat energy.
- Plain glass will let the majority of the sun's radiation pass through to the surface behind.
- The sun's energy is highest when it is directly overhead (midday) and lowest at daybreak, sunset and mid winter when it doesn't rise high into the sky.

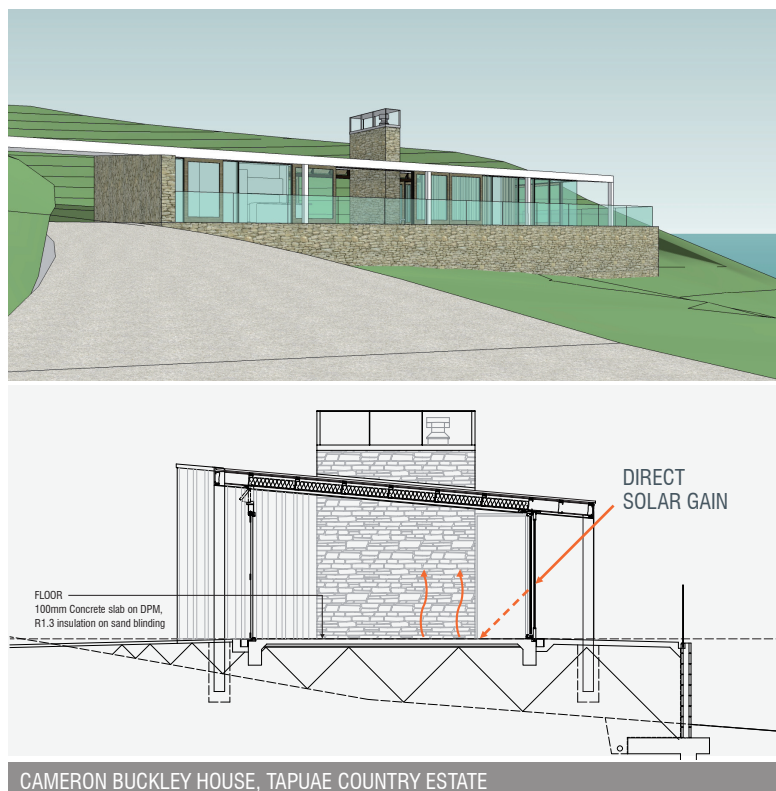
There are three ways to gain heat from the sun in your home:

DIRECT: Exposing interior spaces to direct sunlight, which warms surfaces where heat can be stored. Radiation travels through a glass window and warms the concrete floor. Heat is trapped during the day and slowly released in the cooler evening.

Provided your home is designed with north facing windows, thermal mass to store the heat and good insulation to retain the heat inside, direct solar gain is an effective and efficient heat source. It is particularly effective in New Zealand as we generally don't experience extreme temperature fluctuations between day and night.

INDIRECT: Although based on the same principles as direct solar gain, indirect solar gain is where the thermal mass (e.g. concrete or contained liquid wall) is positioned between the glazing and the space you wish to heat. The heat is stored in the thermal mass and then released into the space behind.

ISOLATED: This method enables you to heat a space that is positioned away from where the sun's energy is collected and stored. Isolated solar gain is achieved through the methods listed above, and then drawing the heat through the home to other spaces. A conservatory space is a good example of isolated solar gain.



CAMERON BUCKLEY HOUSE, TAPUAE COUNTRY ESTATE

The New Zealand Building Code's H1 clause sets parameters to facilitate energy efficiency in our homes. As a guide, the code specifies that glazing be no more than 30% of the floor area of your home in order to protect the thermal envelope of a house. And whilst this might be fine in some scenarios, for others blocking out panoramic sea views in order to comply could reduce the value and liveability of a property.

As architects, we are able to counteract this 'guideline' by utilising the principles of solar gain for your home. Through positioning on site and the selection of materials, we are able to balance potential heat loss through glazing, by maximising gains from the sun's energy – free to use and readily available.

For more information visit:

- www.econation.co.nz
- www.waitakere.govt.nz
- www.level.org.nz
- www.righthouse.co.nz

1. Source: Waitakere City Council's Sustainable Home Guidelines / Design for the sun

In the spotlight

BGBBTA in conjunction with Arthouse Cinema are proud to bring Taranaki an exciting collection of films about architects, buildings and sustainable development for communities world-wide at the upcoming **Architecture Film Festival (24th February – 1st March)**.

In response to Davis Guggenheim's 'An Inconvenient Truth', *Last call for Planet Earth* (screening Friday 25th February, 8.20pm) questions twelve of the most important architects of our time as to their environmental efforts in practicing architecture. This film shares their vision on Architecture that respects nature. This film is for people who care about our future and who want to make a difference.

We encourage you to join us at the film festival. You can find more information on our website: www.bgb-ta.co.nz