



# Heating and Cooling

Given the climate extremes we experience in Alice Springs, it's not surprising that a significant amount of our domestic energy is used for heating and cooling. In fact, you could be using more than 40%<sup>1</sup> of your total energy load on heating and cooling. This fluctuates depending on factors such as solar access, insulation, the colour and material of your roof, the type of air conditioning you run and the schedule and lifestyle of the people living in your home. The challenge of harnessing the best parts of the weather, while maintaining comfort throughout the extremes, can be met through some simple changes.

## Tech Talk

Incorporating passive design elements to suit the local climate can reduce or remove the need for mechanical or electrical ("active") heating, cooling or lighting. It takes advantage of natural airflows and sunlight to make a building comfortable. The approach uses the building orientation, shading/solar access, insulation, natural ventilation, thermal mass and other design elements. By using more passive design features, you can reduce energy usage significantly.

## What can I do?

- Install insulation to reduce internal heat gain or loss.
- Install shade on external windows and walls to prevent solar access in summer and allow access in winter.
- Install thick, backed curtains with pelmets to reduce heat loss in winter or heat gain in summer.
- In Alice, we have a very reliable south easterly breeze. Harness cross-ventilation on summer nights and use cool breezes to expel hot air from the house.
- Control the temperature on your air conditioner thermostat - every 1°C of heating in winter or cooling in summer equals 5 to 10% energy load increase<sup>1</sup>.
- Shade the external parts of your air conditioner from the hot summer sun.
- Reduce the number of hours or days you run the cooling or heating system.



## Tech Talk

'Solar access' refers to the amount of useful sunshine that reaches the living spaces of a home. The amount varies with the arc of the sun through the sky, across the seasons. So, the ultimate design is to have windows and doors shaded from the hot summer sun, but allow warm winter sun in to passively heat the house. This is achieved through the position and size of eaves in relation to the position and size of windows and doors. Curtains, blinds and type of windows are also factors.

### Midday sun angles in Alice Springs:

Summer solstice (the longest day of the year, 21 December)	90°
Autumn equinox	64°
Winter solstice (the shortest day of the year, 21 June)	42°
Spring equinox	65°

Windows and glass can help or hinder your home's comfort levels, depending on their size, position and type.

## Tech Talk

### Heat gain through various glass treatments<sup>1</sup>:

Unshaded single glazed window	100%
Unshaded double glazing	90%
Internal vertical blinds/open weave drapes	76%
Internal venetian blinds	55-85%
Internal holland blinds	55-65%
Tinted glass *A	40-65%
Solar control film/reflective glass *B	20-60%
Trees-full shade to light shade	20-60%
1.0m eaves over north wall	30%
External roller shutter	25-35%
External awning	25-35%
2m pergola over north wall with deciduous vines or shade cloth	20%
Outside metal blind or miniature louvres parallel and close to window	15-20%

### Heat loss through various kinds of window treatments<sup>1</sup>:

Unprotected single glazing	100%
Vertical or venetian blinds	100%
Unlined drapes or holland blinds, no pelmet	92%
Heavy lined drapes, no pelmet	87%
Unlined drapes or holland blinds, pelmets	79%
Double glazing	69%
Heavy lined drapes, pelmet	63%
Double glazing with low-e coating	57%
Double glazing, heavy drapes, pelmets	47%

\*A Effectiveness is reduced as the colour darkens.

\*B Solar film, tinted glass and reflective glass of varying effectiveness is available. They significantly reduce light levels all year round.

<sup>1</sup> "Your Home" Manual, Australian Greenhouse Office.



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