

# NEW HOMES: EFFICIENCY BY DESIGN

RESILIENT  
EAST

In Adelaide, we live in a warm temperate climate, which means that we are well-placed to use good design principles to create homes that keep us cool in summer and warm in winter. In fact, we should be able to make our homes **highly energy efficient (7.5–8 NatHERS stars)** without spending a fortune. This is what passive design is all about – designing for success and resiliency.

**This flyer aims to help you start your journey.**



## Site Orientation

Good orientation is one of the **most cost-effective** ways to improve your comfort and reduce your heating and cooling needs. The sunpath in Australia is to the north. When choosing a site for your new home, consider:

- whether anything is blocking your solar access to the north (other buildings, a fence, trees, etc);
- having living spaces facing north and sleeping spaces south;
- having most windows on the north façade;
- avoiding east and west facing windows;

The aim should be to maximise solar access in the north direction in winter, and minimise it in the west in summer.



## Insulation

Insulation helps to **slow down heat flow** into and out of your home and reduce uncomfortable indoor temperature fluctuations. It is one of the most affordable ways to improve the comfort of your home. The performance of insulation is measured as an R value - the higher the R value, the higher the level of thermal comfort. Generally, R6 for roof spaces and R4 for walls is sufficient to create a comfortable home, when combined with the other design features in this flyer.



## Shading

Appropriate shading designs and structures can help to block **unwanted sun in summer while still allowing solar access in winter**. Consider:

- north façade: fixed or adjustable horizontal shading (such as awnings and eaves) wide enough to block high angle summer sun, let in low-angle winter sun; and/or deciduous vegetation
- east and west façade: adjustable vertical shades; deep verandas; deciduous vegetation.



## Airtightness and Ventilation

Air leaks through unsealed gaps in doors, windows, ceiling, wall, and building joints can cause **15-25% heat loss** in your home in winter.

Fresh air is important in a home, but we need to be able to control when and how much air we let in and out. Consider:

- air tightness testing of your home during the building process (or after) to fix any unwanted gaps;
- wrapping your building with a vapour-permeable barrier (to avoid condensation);
- placing windows to allow for good cross ventilation through the home for summer cooling and fresh air.



## Windows

87% of a home's heat can be gained, and 40% lost through windows. Windows are not good insulators when compared with walls, so their **size, position and type require careful design** to ensure suitable heat gain in winter, while preventing too much of it in summer.

Consider:

- double (or triple) glazing to reduce the amount of heat loss between inside and outside house. It also reduces noise transfer;
- visible light transmittance (VLT) windows (often tinted) can be useful for east and west facing windows but should be avoided for the north;
- choosing low U value windows (low conductivity, better insulation) to avoid transfer of heat and cold between inside and outside. Ideally aluminium frames should be insulated to avoid heat transfer. Timber and UPVC frames are examples of windows with lower U values;
- solar radiation penetrates windows differently at different angles. Higher solar heat gain coefficient (SHGC) values should be avoided for west-facing windows to avoid heat penetration when the sun angle is low in summer;

You can vary the glazing you use throughout the house. Being strategic in placing the right glazing materials in the right areas can greatly reduce your material cost!



## Bonus Tip

- choosing a **light coloured** and/or **heat reflective** roof / external walls to keep cool in summer!

For more detailed and trusted independent information on passive design and/or free home design, scan the codes below:



YourHome site



My Cool Home



Mount Barker  
design guide



Resilient East Climate  
Ready resources

# Efficiency by Design Checklist

Having a well-designed home can save you some serious energy costs down the line, but some features you may decide to put in will add more costs to the initial construction budget. Discuss with your architect, designer and builder to customise what's best for you. Here's a checklist to take with you:

Sustainability and Climate Ready Features		Recommended priority
<b>PLANNING</b>		
Choose the size required for the number of occupants and location of the house within the block	<input type="checkbox"/>	Top 5
<b>DESIGN</b>		
Floor plan: north-facing living spaces	<input type="checkbox"/>	Top 5
Mechanical ventilation: zoned heating and cooling	<input type="checkbox"/>	Top 5
Windows placement: wide horizontal shades in north	<input type="checkbox"/>	Top 5
Windows placement: no or small, well-shaded windows east and west	<input type="checkbox"/>	Top 10
Floor plan: avoid west-facing bedrooms	<input type="checkbox"/>	
Floor plan: designed to maximise cross ventilation	<input type="checkbox"/>	
Floor plan: utilities (laundry, garages) facing west	<input type="checkbox"/>	
Roof: ventilators (like whirlybirds) installed	<input type="checkbox"/>	
Windows placement: adjustable vertical shades east and west	<input type="checkbox"/>	
<b>HEATING / COOLING</b>		
Ceiling: R6 batt insulation or higher	<input type="checkbox"/>	Top 5
Roof: light coloured and/or heat reflective coating (avoid dark colours)	<input type="checkbox"/>	Top 10
Windows: double glazed, thermally broken/insulated aluminium, timber or UPVC frame	<input type="checkbox"/>	Top 10
External walls: north facing - high thermal mass materials (needs to be coupled with shading)	<input type="checkbox"/>	
External walls: east, west, south facing - low thermal mass material	<input type="checkbox"/>	
Floor: high thermal mass material to living areas and bedroom	<input type="checkbox"/>	
Roof: metal sheet instead of ceramic tile to avoid heat absorption	<input type="checkbox"/>	
Walls: R4 insulation	<input type="checkbox"/>	
<b>LANDSCAPING</b>		
Deciduous trees along north and west façade.	<input type="checkbox"/>	
Design for hot summers (e.g. smart water capture and irrigation, drought-tolerant low-maintenance plant species)	<input type="checkbox"/>	
Plant vegetation / fencing to funnel wind breeze from the west in summer	<input type="checkbox"/>	
<b>OTHERS</b>		
Air-tightness testing during construction (or after)	<input type="checkbox"/>	Top 10
Electrify all appliances (rather than gas)	<input type="checkbox"/>	Top 10
Apply weather strips to all windows and sliding doors (not needed if house is designed/built properly)	<input type="checkbox"/>	
Seal exhaust fans to bathroom and kitchen rangehood	<input type="checkbox"/>	