

Building shell improvements



What is a Scorecard assessment?

The Scorecard is a home energy rating program.

An accredited assessor visits your home and looks at the building and fixed appliances. You receive a certificate with your home's energy star rating, comfort and appliance efficiency ratings.

Your Scorecard assessor gives you advice on making your home more comfortable. They make your next steps simple, so you don't miss out on energy bill savings.

Why the building shell is important

A good building shell makes your home more comfortable and lower cost to heat and cool.

Did you know that for many homes, the building shell is its weakest point? A poor building shell means you will be losing out, even if you have more efficient appliances.

Your Scorecard assessment makes it much easier to improve your home's building shell. Building shell improvements are not always obvious, covering the roof, walls, floor, windows, insulation, gaps and cracks.

Look at the hot and cold weather comfort ratings on your Scorecard certificate and the upgrade options provided for your home for improvement options.

Your Scorecard assessor will discuss easy actions and deeper improvements that suit your needs.

Using Scorecard ratings

A good way to start is to look at the first page of the Scorecard certificate.

The *Hot weather comfort rating* shows how your home performs in hot weather without using cooling. The more bars the better..



The *Cold weather comfort rating* shows how your home performs in cold weather without using heating.



If your home's rating is three or less, then consider action to improve your comfort and reduce your energy costs.

Even if you have efficient heating and cooling systems, you can be losing out on your comfort.

Taking action

Your Scorecard assessor is there to help you understand the best actions to take.

Improvement options are shown on the certificate beside the rating. Use this a guide and

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we will look at the four areas where you can take action:

- **air leakage**, gaps and crack such as wall vents and chimneys and gaps that develop over time.
- **windows** let in light and allow heat movement in summer and winter.
- **insulation** slows heat transfer, helps keep the inside of your home comfortable.
- **thermal mass** a high thermal mass helps keep your home temperature stable.

Fixing gaps and cracks

Often the best way to improve comfort and save on your energy bills is to deal with draughts, gaps and cracks. This can be a big issue, between five and 25 per cent of heat loss or heat gain is due to gaps and cracks.

In cold weather, draughts create airflow over your skin which make you feel even colder.

In hot weather when its hotter outside than inside, keep that hot air out. Make sure your house is well sealed and only open up when it is cool outside.

If your home has fixed ventilation, such as ceiling or wall vents, seek expert advice before acting. Wet areas often need ventilation to avoid mould. You may need to install alternative ventilation such as exhaust fans.

Target these areas for sealing:

Exhaust fans

Exhaust fans should have louvres or flaps that close when not in use to reduce unwanted air leakage. If you can't do this, keep doors closed to these rooms. You may even consider draught proofing internal doors of a problem room.

Chimneys

Chimneys for open fires can cause large amounts of air leakage. If you want to use your fireplace, you can fit a damper that blocks the chimney when it's not in use.

You can block the chimney permanently if you don't intend to use the fireplace. Often it is good to block the fireplace from the bottom or within the room. If the blockage is visible someone is less likely to try to use the fireplace in future.

Door and window seals

It is very common that windows and external doors are a source of draughts. Signs are that windows rattle, dust accumulates inside the frame or you feel cold or hot air movement. If you can see light around a door this indicates a big problem.

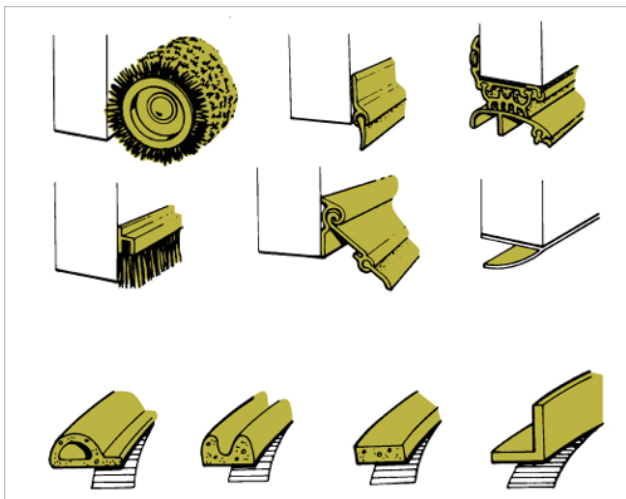
There are many window and door seal products for different situations. For a less-permanent solution, you can stop gaps at the bottom of doors with a door snake.

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Gaps can also occur around the outer edges of the frames where they meet the wall. These can be sealed with caulking and painted over.

This picture shows a range of door and window seals:



Source: *Your Home. Australia's Guide to Environmentally Sustainable Homes*, 2013.

Wall vents, ceiling vents and vented skylights

Homes built before the mid-1980s often have wall or ceiling vents. You can seal or remove these vents unless you use a portable un-flued gas heater or an open-flued gas heater in the room. Never use a portable gas heater in a sealed space.

Vented skylights have a permanent opening, usually covered by flyscreen or mesh. These are generally found in bathrooms and laundries. You can replace the skylight with a new type of sealed roof window or install a sheet of acrylic at the bottom of the shaft that blocks the entire hole.

A cheaper option is to close the door to the area with the venting. You may even consider draught proofing internal doors if it is a big problem.

Downlights

Downlights can be a big issue and an easy fix. Older style downlight fittings can create a lot of air leakage. Incandescent downlight fittings and gimballed (swivel) halogen fittings have big gaps in the fitting.

You can replace them with newer LED fittings. LED lighting is much cheaper to run and can use a sealed fitting to reduce air leakage. Ask your assessor about programs in your area to upgrade your downlights.

Floorboard gaps

Older floorboards may develop gaps between them and allow air leakage. Floorboards tend to shrink, expand and bend when walked on, causing fillers to fall out. The simplest approach may be to install carpet or rugs.

If the under-floor space allows it, you can insulate the floor from below with a product that provides an air seal like foil or insulating boards.

Skirting board gaps

Air leakage can occur in gaps between the skirting and the floor, especially in older homes. On a raised timber floor, there can be significant leakage.

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These gaps can be addressed by using a flexible caulking material, or you can use a foam noodle or filler on large gaps.

Other places for air leakage

There are many other places where air leakage can occur. Your Scorecard assessor will show you where there may be issues. This could include pet doors, pipework penetrations, and evaporative cooler ducts.

Improving windows

It is very important to make your windows work to your benefit. Ten to 20 per cent of heat is lost through windows in cold weather. The potential for heat gain in hot weather is much higher at between 25 and 35 per cent.

There are many easy ways to manage your window to make your home more comfortable.

You can balance the three properties of windows:

- insulation
- let the sun in (light and heat)
- ventilation

Even the best performing windows will not insulate your home as well as an average wall. This means that windows can be a major weak spot, letting heat out in cold weather and heat in during hot weather.

Replacing windows

Both the frame and the type of glass is important for performance.

Window frames can impact significantly on the comfort of the home. Frame materials are shown in order of best performing to worst performing:

	timber or u-PVC
	composite (aluminium outside, timber inside)
	thermally broken aluminium
	aluminium or steel

Glazing comes in many different forms. Double glazing helps to slow heat movement by having a still layer of air or argon gas between the two panes of glass. You can add a low-emissivity (low-e) coating to the glass which further reduces heat transfer. Single glazed low-e coated glazing is available but does not perform as well as double glazing.

Improving existing windows

There are several options if you don't want to replace your windows. Secondary glazing can be created by adding an additional pane of glass, rigid acrylic sheets or soft plastic. Ask your assessor about the most effective option for your situation. There are some cheap simple products available. Adding a second pane also helps with noise reduction.

Internal window coverings

Curtains and blinds can be a good option. For the best effect, make sure air does not circulate between the window covering and the window. Window coverings should be close-weaved and

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hung close to the window with no gaps at the edges.

Well fitted honeycomb blinds or roman blinds are a neat option that suits many homes. Lined floor-length curtains with pelmets are very effective.

External shading

It is essential to shade windows to minimise the amount of heat coming into your home in hot weather.

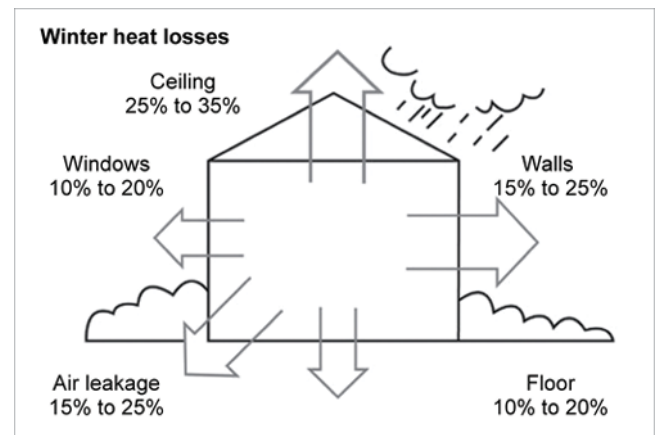
The aim is to stop the sun from hitting the window:

- external shutters or blinds are a flexible option
- temporary shading, like matchstick blinds and foils are a low-cost option
- plants can block summer heat, choose deciduous plants to let sun in during winter
- eaves on north-facing windows can be sized to allow sun in when the sun is low in the sky and block it when it is higher in the sky in summer.

Remember double glazing alone does not significantly reduce the amount of heat entering the house.

Improving insulation

The R value is a measure of how quickly heat moves through a material. The higher the R value, the slower the heat transfer.



Source: SEAV, 2002.

Ceilings and roofs

Between 25 and 35 per cent of heat loss or gain occurs through the ceiling. Adding ceiling insulation will make a huge difference to your comfort, both in hot and cold weather.

If the ceiling space is easy to access you can add or top up insulation so that you have a minimum of R3.5. If the ceiling space isn't easy to access, consider adding insulation when the roof needs replacing or install an insulated false ceiling below the current one.

Walls

Up to 25 per cent of heat loss and 35 per cent of heat gain can occur through walls. Walls are difficult to insulate, so it's best to do it while you are renovating and can replace lining or cladding.

Most stud walls have a 90 mm stud that allows insulation up to R2.5 to be installed. Alternatively, wall cladding is now available that can be

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added internally or externally that includes an insulated layer.

Floors

Up to 20 per cent of heat loss or gain can occur through your floor. Insulation is most effective on floors that have a large space underneath – and these are also often the most accessible. Raised floors are generally timber floors that can be insulated using batts or insulating boards fixed between the joists.

Slab on-ground concrete floors can't be insulated after construction, so insulating the slab is only an option for new homes.

Installing insulation should be done in accordance with the Australian Standard (AS3999:2015) and the wiring rules (AS/NZS 3000:2007) to ensure it is done safely and will give the best possible results.

Improving thermal mass

The thermal mass of your home can improve your comfort, but in the wrong place it can also work against your interests. Luckily there are ways to manage this.

High thermal mass elements, such as brick, rammed earth, tile and concrete, heat up and cool down slowly. Use this to your benefit, in cold weather let the sun or your heater warm the thermal mass inside your home. Your home will stay warmer for longer. For example, draw back the curtains and let the sun in on your concrete

or tile floor, then close the curtains to keep the heat in.

In hot weather, keep the sun off the thermal mass of your home. Close external blinds and your curtains. If it's hotter outside don't let hot air in to warm up the house as it will be slow to cool down again.

Think about how you can make thermal mass work for you. Plants, blinds, eaves and verandas can provide shade. The ground is cool, so in hot weather any thermal mass connected to the ground will keep your home cooler for longer.

You can also consider insulating high mass external walls, ideally with the insulation located on the outside of the thermal mass. This allows the mass to interact with the air temperature inside the room, giving you greater benefits.

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Simple things you can do now

There are easy and cheap things you can do now.

If you are renting or don't want to make big changes, there are things you can do:

- focus your actions on a single room, usually the living area where you spend most of your time
- close internal doors and only heat or cool a small area of your home
- make sure you have curtains and blinds that fit well and are not too lightweight
- change your habits, is it more comfortable outside or inside? Then act, close or open your windows, doors, curtains and blinds depending on the outside temperature
- draught-proof doors and windows, fix other draughty gaps
- bathrooms and laundries tend to have high air leakage rates, so keep these doors shut
- change light globes to LED (to change the fittings, you may need your landlord's permission)
- ask your landlord to install roof insulation

There are programs that can assist. Remember to ask your assessor about government programs in your local area.

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