

FREE Guide Building a New Home



For more information, visit:

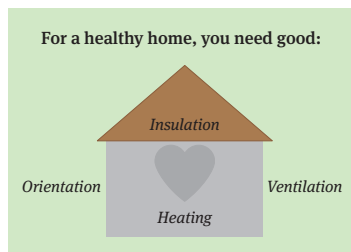
buildbacksmarter.co.nz

Where to start

When building your new home make it warmer, drier, healthier and cheaper to run - it's your chance to build back smarter.

Where to start for a healthy home:

- | | |
|-----------------------------------|---|
| 1. Reduce heat loss | Boost ceiling, underfloor and wall insulation, double glaze with low-emissivity glass and thermally-broken window frames and use two layers of thermally-backed full length curtains. |
| 2. Efficiently heat your home | Position your home and windows to face the sun and choose an efficient heating system able to warm living areas to a minimum of 18°C and bedrooms to a minimum of 16°C. |
| 3. Control moisture at the source | Remove damp air from your home by installing an extractor fan in all bathrooms, a range hood in the kitchen and vent your clothes-dryer to the outside. |
| 4. Be water-wise | Insulate hot water pipes and hot water cylinders, choose water-efficient taps, low-flow showerheads, dual flush toilets, and water-efficient washing machines and dishwashers. |
| 5. Regularly ventilate your home | Open windows and doors for a few minutes each day to remove moisture and allow fresh air to circulate throughout your home. |



Ask your designer or builder about:

Homestar.org.nz

Homestar measures the health, efficiency and environmental performance of your home. The advice provided in this guide aligns with aspects that would be considered by Homestar. The Homestar website also lists certified designers and builders, so you can select a practitioner able to put these practical ideas into action for you.



Lifemark.org.nz

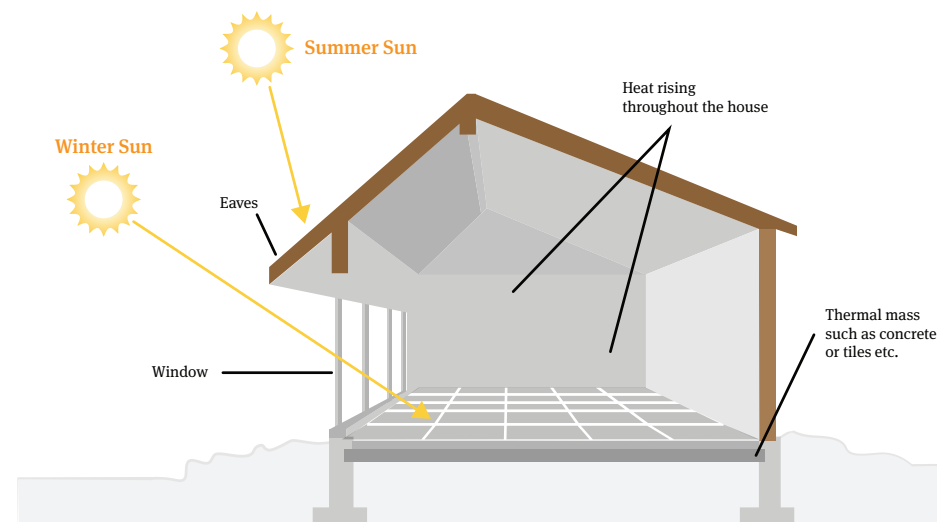
Lifemark provides a practical checklist and guide to improve the liveability of your home for people of all ages and all abilities. A Lifemark certified home will be more flexible and adaptable as your needs change and is often called lifetime design.



External features to consider when building your home

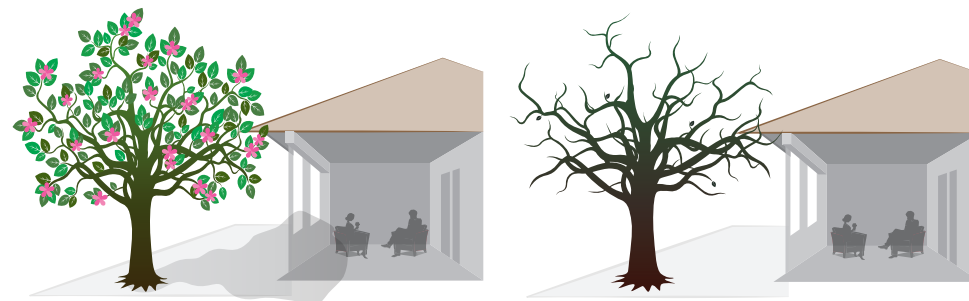
1. Face the sun

When building a new home orientation toward the sun is critical. Aim to maximise the sun's warmth during winter and to limit overheating in summer for example 1m² of north facing window is equivalent to a one kilowatt heater. Appropriately size and locate windows and doors (most on the northern side and least on the southern sides of your home). Use eaves, trees or external shading to reduce overheating in summer especially on the north and western side of your home. Ask your designer or building about passive solar design.



2. Consider shading

The sun travels higher in the sky in summer and lower in winter. Use overhanging eaves, deciduous trees or awnings to ensure you do not overheat in summer, yet allow winter sun to warm your home. During winter when you want the sun, keep in mind that objects cast shadows three times their height. If possible, your home should be sited well back from anything that will shade your windows during winter.



3. Escape the wind

You will enjoy outdoor living more if spaces are sunny and sheltered. Use your home, structures or trees to provide shelter from cold prevailing easterly winds and, if possible, orient outdoor living spaces to the north or west.

4. Keep it quiet

Design your home and garden to help reduce external noise penetrating your home, especially for living areas and bedrooms. Consider sound-reducing insulation in walls within and around your home to help reduce the transfer of noise.

5. Be solar ready

If you are thinking about solar energy, you will need to consider the slope and orientation of your roof to get the best of any solar system. A roof with a northern aspect and a gentle slope of around 30 degrees will perform best. This slope will allow your solar panel to sit flat against the roof, often a more aesthetically pleasing solution.

6. Go native

Native plants tend to be hardy, require less maintenance and less watering. Because most natives are evergreen, they are good for privacy, shelter and shade. Careful placement should minimise winter shading of windows. Choose a mix of plants that provide year round food for birds offering a diversity of flowers, nectar, berries and bugs throughout the seasons.

7. Grow an edible garden

Enjoy fresh, healthy and delicious fruit, vegetables and herbs grown at home. Include edible trees, shrubs and raised beds in your home garden. For information about what varieties are suited to Canterbury visit www.edible.org.nz

8. Be neighbourly

Provide for outdoor privacy, but also include an open, more public front yard that supports chats with neighbours and interaction with people passing by. Avoid blank garage doors dominating the street frontage. Windows and doors that face the street make it safer and more welcoming for all.

9. Make it easy to recycle

Place recycling and rubbish bins in a convenient location so you can easily take items to the bins and then easily take the bins to the kerbside each week. You will recycle more when it is easy.

10. Be sensitive to your site

Aim to minimise the amount of earthworks required for your home and landscape. Your design should make the most of your site's natural features such as slopes, hills, waterways and aim to preserve existing trees and shrubs.

11. Capture views

Views enhance the enjoyment and value of any house. Maximise and frame your best views, consider future obstructions and complement existing natural features.

12. Be resilient and future proof

When choosing your location, check Council property records for natural hazard risks in the area. Potential hazards, such as floods, rock fall, liquefaction, sea-level rise and tsunami should be indicated on property records. When building, ask your designer or builder about options that can enhance your resilience to the risks identified. It is also worth checking to see if your land may be contaminated from previous activities. A Listed Land Use Register is held by the Regional Council at www.llur.ecan.govt.nz/Public

13. Harvest rainwater

Collect rain from your roof to provide water for your garden or for flushing toilets and to provide a useful emergency water supply. Check that your roofing material and paint are suitable for collecting rainwater for example, avoid copper, lead and exposed galvanised steel. Ask your builder about collecting and using rainwater in your home and garden.

14. Let rain water your garden

Use rain gardens to naturally absorb and purify any run-off from your driveway, path or roof. Consider permeable paths and driveways that allows rainwater to pass through into the soil and garden. Minimise hard impervious surfaces that can exacerbate surface flooding.

Internal features to consider when building your home

1. Boost your insulation

A well-insulated home is essential for year round health and comfort, and for lowering your heating costs. Talk with your designer or builder about boosting your insulation above minimum building code requirements. Aim for at least the following R values*:

Ceiling insulation R4.0

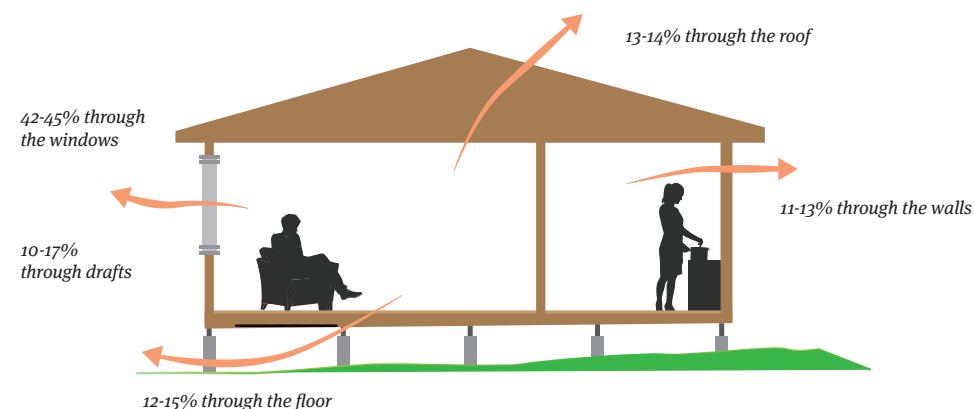
Wall insulation R2.6

Underfloor insulation R1.9

If you have a concrete slab floor, it is important to insulate around the perimeter of the floor to stop heat leaking into the surrounding ground and air. Most heat is lost at the edge of a concrete floor.

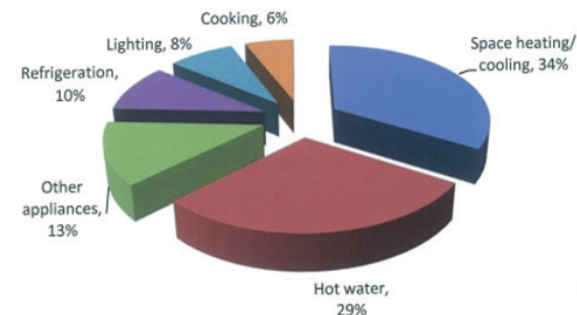
* The R value (Resistance to heat loss) is a measure of the effectiveness of the insulation - higher numbers mean less heat loss, so the bigger, the better.

Typical heat loss in an insulated home



Source: www.level.org.nz

Typical sources of energy use in a New Zealand home (source Energy Efficiency and Conservation Authority)



2. Heat efficiently

Home heating is often the largest contributor to your energy bills (making up 35%). Choose the most efficient source of home heating, sized appropriately to your house. Options include a clean air-approved log burner or pellet fire, heat pump or electric heater. Energy Star-labelled appliances are the most energy efficient, so will cost you less to heat your home. Aim to warm living spaces to a minimum of 18 degrees and bedrooms to a minimum of 16 degrees.

Comparative heating costs for a range of home heating options

Fuel	Appliance	Energy Efficiency	Output (kw)	Installed Cost (\$)	Heating Cost (\$ / hr)
Electricity	Fan heater	100%	2.4	30	0.57
	Oil column heater	100%	2.4	170	0.57
	Radiant bar heater	100%	2.4	80	0.57
	Night store heater	80%	3.4	1,400	0.61
	Heatpump	370%	5.4	2,750	0.34
	Heatpump central heating	330%	14.0	15,000	1.00
	Ground source heatpump central heating	400%	15.0	32,000	0.89
Gas	Flued gas heater	80%	7.0	5,400	1.66
Pellet	Pellet fire	82%	9.5	5,100	1.16
Wood	Free standing log burner	70%	16.0	3,500	0.86
	Englosed log burner	65%	14.0	3,500	0.81

Source: Environet Ltd, heating choices and costs for Christchurch 2013

3. Remove moisture at source

A damp home is much harder to heat and can lead to condensation and mould. Ensure all bathrooms have extractor fans (minimum 120mm in diameter) that are vented outside. Install a kitchen range hood to remove odours and moisture from cooking. Ensure your clothes dryer is also externally vented and avoid drying clothes inside.

Main sources of moisture in the home:

Clothes drying	4 litres per wash
Cooking	3 litres per meal
Showering	0.5 litres per person

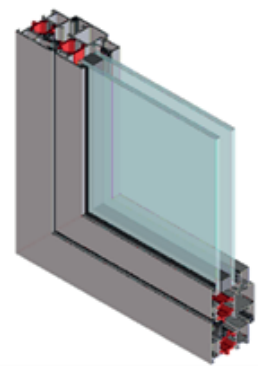
4. Open windows and doors each day

Opening windows and doors for just a few minutes each day is a great way to remove moisture and allow fresh air to circulate throughout your home. Ensure that every room is able to be adequately ventilated with an opening window or door. Windows that have ventilation latches or security stays are useful to securely allow fresh air to enter the home.

5. Be window wise

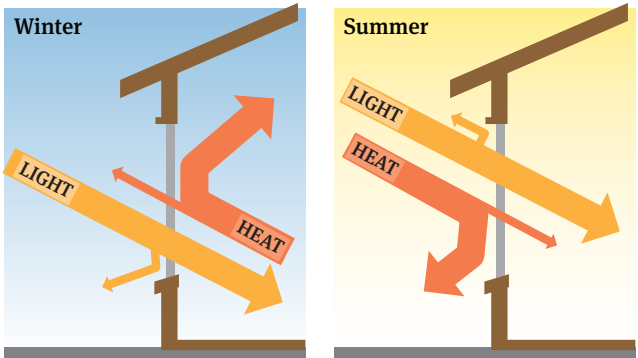
Windows very are important for keeping heat in and noise out of your home. A modern home can lose about 40% of its heat through its windows. Choose high-quality double-glazed windows with thermally-broken frames to avoid condensation and Low-E glass (low emissivity) which is an invisible coating that acts like a mirror reflecting heat back into your home. Low-E glass can increase the thermal performance of your windows by 30% with little additional cost.

Thermally broken window



A small plastic barrier, as shown in red, reduces heat loss and condensation.

Low emissivity or Low-E glass

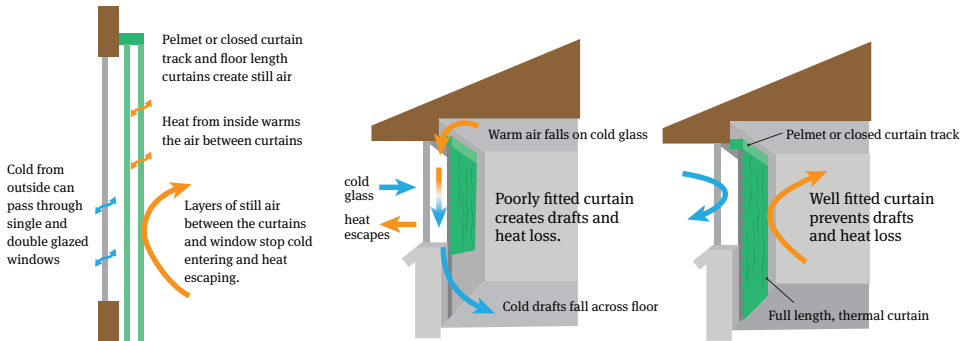


An invisible layer on the glass keeps you warm in winter and cool in summer.

6. Double-up your curtains

Because windows are a large source of heat loss in a modern home (about 40% of heat can be lost through windows), good curtains can dramatically improve your comfort and lower heating costs. Use two layers of thermally-backed and full-length curtains (or a second layer of thermal black-out). Close your curtains in the early evening to trap in the day’s heat and to block out cold through the night. Choose close-fitting curtain tracks, which act like small pelmets above the window, to stop warm air at the ceiling being drawn onto cold windows and circulating cold air round the room.

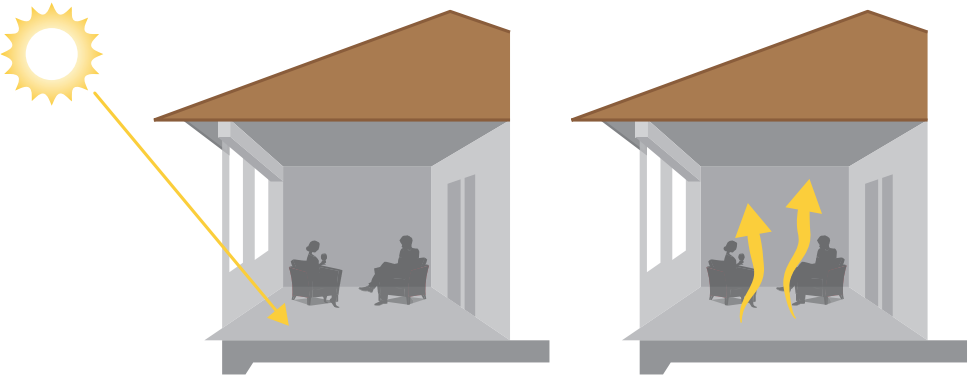
Two layers of thermally-backed curtains significantly improves heat retention.



Source: Build Back Smarter

7. High thermal mass

Dense materials such as concrete, tiles or brick can help maintain comfortable temperatures in the house by absorbing heat from the sun and then slowly releasing it. To be effective thermal mass needs to be directly heated by winter sun and shaded in summer. Place dense materials beneath north-facing windows or surrounding a clean air-approved log burner to help store and moderate indoor temperature. Use outdoor shading to help cool your thermal mass in summer.



8. Light efficiently

Lighting makes up about 15% of the average electricity bill. Good quality LED’s (light emitting diodes) can last up to 30 years and each year save about \$150 per bulb (in comparison to normal bulbs). LEDs can be used in most modern light fittings. People often prefer warm/soft coloured lights (3000k or less). Brighter, white lights could be considered for your bathroom, kitchen, workshop or outdoor areas (3300k or more). Where possible, avoid the use of recessed down lights. There is a wonderful range of ceiling mounted, hanging pendant, up-lights or wall mounted lights able to illuminate rooms more efficiently.



When using recessed down lights, specify type IC or IC-F labelled fittings. This will allow insulation to be placed over the top of the light fitting, significantly reducing heat loss.

New Zealand Down Light Fitting Classifications

Source: Lighting Council New Zealand (www.lightingcouncil.org.nz)

Classification	Description	Label
Non-IC	Insulation must be at least 100mm away on all sides. Not recommended.	
CA 135 and CA 80	Insulation must not cover, but can be close to the sides of the light fitting (abutted only). Not recommended.	
IC and IC-F	Insulation can cover and surround the light fitting (abutted and covered). Recommended.	

9. Choose efficient appliances

Choose Energy Star-labelled electric appliances like television, stereo, computer, fridge or dishwasher. Energy Star appliances will have the lowest running costs. Most homes can save \$100 per year simply by switching appliances off at the wall when not in use because of the stand-by energy used.



More help is available

10. Efficient water heating

Hot water heating contributes to about 35% of your household energy bill. Reduce your water heating costs by choosing an AAA rated cylinder, lagging all pipes, insulating cylinders, using water-efficient taps and showers and locating cylinders close to the bathroom and kitchen. Also ensure cylinders are securely strapped and braced in place to minimise earthquake damage. If you use a lot of hot water consider solar hot water system or hot water heat pump.

Highest running cost

- \$ Electric water cylinder
- Gas water storage
- Instant electric
- Instant gas
- Fireplace wet back
- Solar hot-water
- Hot-water heat pump
- Solar / wetback in combination

Lowest running cost

Excludes purchase and maintenance costs

source: Home Performance Advisor Manual

11. Conserve our precious water

Select fittings or appliances that have been assessed by the Government's Water Efficiency Labelling System (WELS) - the more stars, the more water efficient. Choose water-efficient taps, showers, dual-flush toilets, washing machines and dishwashers to reduce the amount of drinking water used in the home.



12. Select Environmental Choice

Choose building products that are good for you and the environment - non-toxic, low-VOC (volatile organic compounds) and sustainably produced. Environmental Choice is a trustworthy eco-label that provides an independent assessment of the sustainability of products such as paint, insulation, plasterboard, carpets and floor coverings and joinery.



NEW ZEALAND

13. Go solar

Solar energy is becoming more popular with options that produce electricity directly from the sun (PV or photovoltaics) or that convert the sun's heat into hot water (solar thermal). Going solar will rely on your home already being designed to minimise energy use, so your solar system can be scaled to meet your lower energy needs.

14. Reduce your rubbish

Ask your builder to follow the nationally recognised REBRI (Resource Efficiency in Building Related Industries) guidelines. This will mean your builder and contractors will follow a waste management plan and send less rubbish to landfill.

BRANZ provides detailed advice about home renovation

www.renovate.org.nz

EECA provides tips, guides and online calculators on home energy use

www.energywise.govt.nz

MBIE provides guides on the building code, weather tightness and earthquake resilience

www.building.govt.nz

MFE provides guides about ways to make a healthy and efficient home

www.smarterhomes.org.nz

ECAN provides lists of approved wood burners (look under 'Our Responsibility - Air Quality')

www.ecan.govt.nz

Consumer Institute provides guides on home building, renovation, and maintenance

www.consumer.org.nz

Sustainable Living offers adult education and future living skills courses

www.sustainableliving.org.nz

Power Switch helps you find the best electricity provider for your home

www.powerswitch.org.nz

For more information, visit:
buildbacksmarter.co.nz



