

roofing material options.

1. Find out about grants or loans assistance for insulation from EECA.
2. Investigate opportunities to install extractor fans with external venting, and remove downlights.
3. Work out a budget for the work including the additional costs of better insulation, ventilation, lighting and more suitable roofing material options.

Next steps:

- » Roof colour - lighter roofs reflect heat, keeping the house cooler in summer.

» Talk to your builder / roofer / electrician about...

- » The damage to your roof and the best options available to get more insulation installed.
- » Fixing other issues at the same time - such as putting in ventilation to bathrooms and kitchens - and the order in which these should be done to minimise damage to the new insulation.
- » Replacing downlights at the same time so there are no gaps in your insulation.

Household running cost savings	Improved comfort and better health	Increased capital value of the home	Improved Homestar™ rating

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Ceilings and Roofs

Challenge:
Damaged ceiling or roof – external or internal

Opportunity:
Upgrade ceiling insulation and remove recessed downlights (see lighting section). Change roofing material. Upgrade or install bathroom and kitchen ventilation.

Solution:

Standard ceilings / roofs (houses with an accessible ceiling space): Remove damaged linings and any damaged ceiling joists and replace. Remove and replace recessed downlights (see Lighting section). Fit thick-bulk ceiling insulation between and over the ceiling joists (ideally as a blanket). Aim for R_{2.0} insulation or more. If you want to be warmer (this may be installed as a couple of layers and could be 175 mm or thicker, depending on the type of insulation). Where roofing material is damaged, replace with suitable new material – consider more earthquake-proof options such as long run steel, rather than heavy tiles, for your roof covering. Ensure existing extractor fans in bathrooms and kitchens are vented to the outside of the house (through the roof or under the eaves), or fit extractor fans if you don't already have them.

Skillion roofs (houses without ceiling space): If only the internal linings are damaged, these can be removed and, if there is enough room between the linings and the roof, additional insulation can be added prior to new linings being put on. Your builder may need to make additional room in the roof cavity by packing or spacing it out with battens to get extra insulation in. If the roofing material is damaged, it may be cost effective to have it removed, upgrade the insulation levels, and have the roof put back on at the same time. Again, aim for as high an R value as possible – ideally at least R_{2.0}.

Cost estimate:

The cost of adding ceiling insulation to a standard roof without any previous insulation is between \$2,000 and \$3,500. Grants are available from EECA for all houses built prior to 2000 and these can cover a third or more of these costs.

Benefits:

Ceiling insulation will stop heat loss through your roof, keeping your home warmer in winter and cooler in summer. This can provide as much as \$500 worth of savings per year compared to a non-insulated house.

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Build Back Smarter...

Your chance... TO BUILD BACK SMARTER

Many houses in Canterbury have been damaged by earthquakes. Recovering from this damage presents a unique opportunity to make houses better for you, better for the environment and cheaper to run.

Repairing earthquake damage is the ideal time to consider improving your home and the benefits it can bring:

- » A warmer, drier, more comfortable home
- » Reduced energy bills and less water use
- » Improved health with fewer visits to the doctor
- » A more resilient and valuable home

In most cases you, as the homeowner, will have to fund the additional cost of the improvements set out in this guide. The good news is that government grants are available for insulation, clean heating, solar and heat pump hot water, and chimney replacement. Plus, best of all, you can enjoy the benefits as long as you live there.

The purpose of this guide is to help you when talking with builders and in making decisions about repairing your home. It provides tips for repairing your home and gives indicative costs and savings that could be made for an average sized, three to four bedroom home.

Before you do anything...

Make sure that you have made a claim with the Earthquake Commission and that your house has been assessed (www.eqc.govt.nz, 0800 326 243). Once you have a better idea of the type of repairs needed, do some further research and make a checklist of the improvements specific to your home so that you can discuss them with the relevant insurer, builder, and tradespeople.

Find further information on:

- » Government grants for insulation and heating from the Energy Efficiency Conservation Authority (EECA); www.energywise.govt.nz/funding-available/insulation-and-clean-heating
- » Government grants on water heating: www.energywise.govt.nz/funding-available/solar-and-heat-pump-water-heating-funding
- » Government grants for chimney replacement with efficient heating: www.eeca.govt.nz/eeca-programmes-and-funding/programmes/chimney-replacement
- » Christchurch City Council solar hot water consent rebate: www.ccc.govt.nz/homeliving/buildingplanning/buildingconsents/applicationpacks/solarwaterheaters.aspx
- » Consumer NZ reports on:
 - > Downlights www.consumer.org.nz/reports/recessed-downlights
 - > Solar water heaters www.consumer.org.nz/reports/solar-hot-water-systems
 - > Heat pump water heaters www.consumer.org.nz/reports/heat-pump-water-heaters
- » Double glazing options: www.smarterhomes.org.nz/design/glazing/
- » Calculating your heating requirements: www.energywise.govt.nz/how-to-be-energy-efficient/your-house/heater-sizing-calculator
- » Environmental Choice products: www.enviro-choice.org.nz/
- » Efficient lighting options: www.rightlight.govt.nz

For general information on improving your home:

- » Smarter Homes www.smarterhomes.org.nz
 - » Download two key publications: Your Guide to Smarter Living and Your Guide to Smarter Insulation.
 - » Beacon Pathway www.beaconpathway.co.nz
 - » Download an in-depth homeowner manual www.consumerbuild.org.nz
 - » Level, more technical detail on home improvements: www.level.org.nz
 - » Department of Building and Housing website that provides guidance and information on building code requirements. www.dhb.govt.nz/canterbury-earthquake
- Seek advice from:**
- » Community Energy Action Charitable Trust's free advice service: for free advice on all home energy matters and associated renovations. Call 0800 388 588, email energyadvice@cea.co.nz or visit <http://www.cea.co.nz/charitable-programmes/#hec>.
 - » Community Energy Action Charitable Trust's insulation and heating installation service: For free insulation checks and free insulation and heating quotes (with government subsidies) Call 374 7222, email info@cea.co.nz or visit www.cea.co.nz
 - » Your local Eco-Design Advisor, free and independent advice on home design. Home designs can be emailed to advisors and discussed over the phone or during site visits. www.ecodesignadvisor.org.nz



This pamphlet is a joint publication of:



Builders' speak

What is an R value?

The effectiveness of insulation is measured by its R value. The higher the R value on an insulation product, the more it slows down the transfer of heat. Generally, the R value of insulation gets higher as the product gets thicker. For example, an R3.0 product has greater thickness than a R1.0 product of the same type. Using R values helps you to compare the effectiveness of different types of insulation.

Finding tradespeople

Look for membership with reputable associations such as Registered Master Builders, Certified Builders, or Master Plumbers. Electricians should be registered with the Electrical Workers Registration Board, and plumbers and gasfitters with the Plumbers, Gasfitters and Drainlayers Board. Solar water heater installers must be accredited by the Solar Industries Association, and wood or pellet burner installers must be accredited by the NZ Home Heating Association. Heat pumps use refrigerants and therefore installers should have both electrical and refrigerant certification (HVAC engineer).

The Department of Building and Housing has just started a Licensed Building Practitioner Scheme which has a list of all registered tradespeople (<http://bp.dhb.govt.nz/publicregister/search.aspx>). Under new building laws, tradespeople must be registered with this scheme in order to do certain kinds of work. Christchurch City Council has also developed a list of accredited contractors for earthquake recovery work (www.ccc.govt.nz/business/constructivedevelopment/index.aspx)

Obtaining consent

In most cases you will require a building consent to undertake any major repair work. Talk to your builder or the Christchurch City Council about obtaining building consent before starting any repairs. For more information, visit:

www.ccc.govt.nz/homeliving/buildingplanning/index.aspx

A note on waste

To reduce construction waste going to landfill, and to gain further points in the Homestar™ rating tool, your builder and tradespeople should be encouraged to follow REBRI (Resource Efficiency in the Building and Related Industries) guidelines for waste management. These provide information and advice on:

- » What materials can be recycled or salvaged.
- » How to develop a waste management plan and system.
- » How to separate and store waste.

For more information, visit: www.branz.co.nz/rebri

You may also be able to find ways of using waste material around your neighbourhood, e.g. your old bricks could be someone's new paving.

homestar.org.nz

Homestar™ measures or rates the performance of your home, in a similar way to the energy star rating for a washing machine or fridge. The advice given here closely aligns with the Homestar™ rating tool – so making the effort to build back smarter can increase the performance, value and comfort of your home. A trained Homestar Practitioner can provide you with professional advice about incorporating good environmental design and help you get the appropriate Homestar rating. Use the free online version of the rating tool to compare different options for your home www.homestar.org.nz.

Walls

Challenge:
Internal or external wall damage

Opportunity:

If you have to replace the wall linings or external wall cladding this is the best time to add or upgrade the insulation in the walls.

Solution:

In timber and steel frame walls, remove damaged linings or external wall cladding as well as any damaged framing. Increase the bracing where required. Add insulation and building wrap (building paper). Replace with new linings or cladding. Add insulation that is at least R2.6, the higher the better. Note that higher levels of wall insulation beyond R2.6 may only be possible if you increase the width of the walls or rebuild completely.

Cost estimate:

The insulation itself isn't that expensive but fitting it will take the tradespeople extra time. Allow between \$2,200 and \$2,800 for the costs of the insulation for an average sized house, and \$1,200 extra for fitting.

Benefits:
Wall insulation will stop heat being lost, keeping your home warmer in winter and providing as much as \$400 worth of savings per year compared to a non-insulated house.

Household running cost savings	Improved comfort and better health	Increased capital value of the home	Improved Homestar™ rating

Talk to your builder about...

» The best insulation options for your home – and whether it is worth doing the whole home at the same time.

» Taking advantage of opening your walls for insulation to also check your wiring and plumbing. In older houses, it may be cost effective to re-wire at the same time.

» Prioritising living areas, bedrooms and the south facing colder sides of the house first as these will be the ones losing the most heat.

» Ensuring that insulation is installed in accordance with the appropriate NZ standards (especially NZS 4246:2006 – see www.energywise.govt.nz/node/3009).

Next steps:

1. Find out about grants or loans assistance for insulation from EECA.
2. Work out a budget, including what your insurance will cover and any financial support for additional costs.

Benefits:
More efficient lighting will reduce energy costs, while removing downlights will allow you to fill insulation gaps and keep heat inside the home, potentially saving you as much as \$500 per year.

House

Heating and Chimneys

Challenge:
Fallen or damaged chimney or fireplace

Opportunity:
Replace your old heating system with a new, efficient and clean one.

Solution:
Remove or repair damaged chimney and consider more efficient alternative heating options such as heat pump or low emission wood or pellet burner. Block or remove open fireplaces. If retaining chimney for aesthetic or heritage purposes, an inset wood or pellet burner with a central flue up the chimney can assist structurally but you may also need to have it strengthened in case of future earthquakes - see EQC flyer, Easy Ways to Quake Safe Your Home.

Cost estimate:
Varies depending on situation, level of damage, and option chosen.

- » Chimney removal between \$500 - \$1,000.
- » Heat pump of an average size would have an installed cost of approximately \$4,000.
- » Low emission wood burner or wood pellet burner between \$3,000 - \$4,000.
- » Subsidies of up to \$500 or more are available from EECA to support the installation of clean heating devices, provided the house is well insulated. Further subsidies are available to replace chimneys.

Benefits:
Keeping your home warm (18°C in living rooms and 16°C in bedrooms as minimums) is vital to your health and comfort, so proper insulation and an efficient heating system are a must. The typical New Zealand home uses about 35% of its energy on heating - so getting it right can save you money. Putting in an efficient system can save an average household up to \$500 per year compared to standard electric heating.

Household running cost savings					
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Increased capital value of the home					
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Talk to your builder about...

- » Ways to move the heat around the house - if you are having work done up in the ceiling, this could be a good time to think about installing a simple ducted heat transfer system to move heat from the living room to the bedrooms. They should be between \$300 and \$1,000 depending on the number of rooms you wish to connect.
- » Making sure you have good insulation in the house to trap in the heat.

Next steps:

1. Discuss options about removing the chimney and blocking off any open fires.
2. Investigate the potential for grants / loans assistance from EECA.
3. Investigate suitable heating systems with suppliers.
4. Seek advice from a heating specialist (e.g. your local Eco Design Advisor).

Windows

Challenge:
Broken or poorly fitting windows and joinery

Opportunity:
Replace damaged windows with more efficient double-glazing or 'low-e glass' options; consider reducing window size on the southern and western sides of the house.

Solution:
If your frames are undamaged and only the glass is broken, install double glazed inserts or high performance 'low-e glass' into your existing window frames. The 'e' stands for 'emissivity', which means that it lets light in but stops heat escaping as quickly as normal glass.

If replacing entire window frames, aim for thermally broken aluminium or wooden/PVC frames as these perform the best at keeping the heat in and stopping condensation forming on the windows. This is also a good time to reassess the necessity for windows on colder, less sunny sides of the house (typically southern and south-eastern). Walls lose much less heat than windows, so consider the option to resize the glazed area, replacing it with a smaller window and a well-insulated wall.

Cost estimate:
If the window glass or frames need to be replaced due to damage, this is the best and most cost effective time to upgrade to a more efficient window type. Costs vary widely due to the difference in size and type but, as a guide, double glazing is about \$80 - \$110 more per m² to replace compared to single glazing. So a small extra cost for much added comfort.

Benefits:
Double-glazing will reduce your heat loss in winter and help to stop overheating in summer, adding to the value of your home.

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Talk to your builder and window manufacturer/supplier about...

- » Which windows need full replacement of frames and which might just require new glass.
- » The difference in costs between single and double-glazing solutions.
- » Options for reducing window size on the colder southern sides of the building and positioning windows on the warmer northern sides to make the most of the sun's warmth in winter.

Next steps:

1. Prioritise double-glazing in those windows that need to be replaced on the colder southern sides of the house as well as main living areas.
2. Investigate double glazing options and benefits.
3. Investigate pricing options for different types of higher performance glazing.

Build Back Smarter...



Floors and Foundations

Challenge:
Damaged floors and foundations, cracked concrete slabs and un-level floors

Opportunity:
Repairing your floor and foundations provides a golden opportunity to upgrade the insulation, add a ground moisture barrier, strengthen the foundations and potentially raise the floor level for increased flood protection.

Solution:
This will vary depending in the type of floor and the extent of the damage. Some floors will need to be re-levelled, some will require rebuilt foundations, and others may necessitate a full house rebuild. Foundations are critical to a safe house and several technical specialists may be required (such as geotech specialists, engineers and builders). An example of an engineered solution is strengthening the foundations with tied steel and using compacted hardfill, instead of tailings, underneath any new concrete floor slab. Whatever the path taken to rebuild your home, the opportunity to add insulation under the floor should not be missed.

Concrete floors:
Adding insulation under a concrete slab can only be achieved when a new slab is poured. If this is required, talk to the builder about having a minimum of 50 mm 'S grade' expanded polystyrene (EPS) board over the damp proof membrane prior to the poured concrete slab. In addition, the perimeter of the slab should also be insulated as

most heat is lost through the edges of the concrete, rather than through the middle of the slab down into the ground. If a whole new slab is not required but works are being carried out to level and repair the slab, investigate options to add insulation to the perimeter.

Timber floors:
If suspended timber floors are being repaired or replaced, ensure that they are insulated with a bulk insulation product of at least R1.4 under the floor. Provided there is adequate access space under the floor (more than 40cm), take the opportunity to install an on-ground moisture barrier (usually black polythene) to stop rising damp. Fix any drainage issues or leaks under the house at the same time. Some people have found new springs or moisture coming up beneath homes because of ground movement. To improve performance of wooden floors in areas of ground instability, ensure the piles are based below the liquefaction layer.

Cost estimate:
Adding underfloor insulation to a suspended timber floor of an average 150 m² house would cost about \$1,500 - \$2,000; and grants are available from EECA to help pay for underfloor insulation in houses built prior to 2000.

Benefits:
Upgrading floor insulation can keep you warmer and drier and save an average home up to \$250 per year in heating costs

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Talk to your builder/engineer about...

- » The scope of the damage to the foundation and the potential to add underfloor or perimeter insulation as part of the rebuild process.
- » The potential to raise the floor level as part of the rebuild in order to protect the property from newly identified flooding risk in Christchurch.

Next steps:

1. Ensure that all the technical reports and specialist engineering advice relating to the property are available to the builder.
2. Investigate the potential for financial assistance from EECA for adding insulation under suspended timber floors.
3. Work out a budget for the work including the additional costs of adding the underfloor insulation and moisture barrier.

Hot Water Systems

Challenge:
Broken or damaged hot water system

Opportunity:
Install seismic restraints (straps) around the hot water cylinder, or if badly damaged, replace with more efficient solar hot water or heat pump hot water system and upgrade piping and lagging (insulation around pipes).

Solution:
Remove the old damaged system and upgrade with either solar or heat pump hot water heating. Both systems are significantly more efficient than the usual electric hot water cylinder and, despite the higher up-front costs, this will save you money in the long run. Solar works best where you have a sufficient area of roof exposed to northerly sun throughout the year. If your house is heavily shaded by trees or other buildings, or if you don't have any north-facing roof space where solar panels can be mounted, a heat pump hot water system might be preferable - but make sure that it is capable of operating efficiently in Christchurch's climate.

If replacing the entire system, it could be a good time to reconsider how efficient your piping is. Try to avoid long lengths of hot water pipe runs and make sure all hot water pipes have good levels of lagging (insulation) around them.

Cost estimate:
Solar hot water and heat pump hot water system costs vary depending on size and set-up. An average system could be expected to cost about \$5,000 - \$6,000 installed. You may be eligible for a grant of up to \$1,000 towards this from EECA.

Benefits:
A well installed and efficient system will significantly reduce your daily water heating costs - by as much as 75%.

Household running cost savings					
Improved comfort and better health					
Increased capital value of the home					
Improved Homestar™ rating					

Talk to your builder, plumber or hot water specialist about...

- » Your house set-up, the overall site and the best options for heating water. How much sun lands on your roof? Is there a suitable place for a heat pump hot water cylinder?
- » Ensuring that the system you are considering is designed to work at low temperatures. Ask to see performance results to make sure it works efficiently in the Christchurch climate.
- » Ensuring location of outside unit for heat pump water heaters is suitable. Consider efficiency (the warmer spot the better), as well as the potential noise of the unit (away from bedrooms and neighbours).
- » installing high pressure water systems to eliminate the need for header tanks which are susceptible to falling or damaging the building during an earthquake.

Next steps:

1. Check out EECA's solar and heat pump hot water grant information to see if you qualify.
2. Discuss options with your builder or hot water specialist - assessing the whole house and site for the best approach.
3. Make sure that your installer is well qualified and has a lot of experience - research shows that the quality of installation is the biggest factor in how well your system will perform.

Materials and Finishes

Challenge:
Damaged paintwork, joinery, and carpets

Opportunity:
Replace damaged materials and finishes with healthier and more environmentally friendly options.

Solution:
Specify products labelled with an Environmental Choice tick which have a lower environmental impact. There are a wide variety of building products that are labelled with the Environmental Choice tick - these include paints, insulation, plasterboard, carpets and floor coverings and joinery. Where possible, choose sustainably sourced, recycled or local products. Look for low or no VOC (Volatile Organic Compounds) levels in paint, glues, polyurethane and carpets. Minimise resource use by selecting quality products that are durable, repairable and easily maintained and use local products and services to support our local economy and to reduce transport emissions.

Cost estimate:
In most cases, products with Environmental Choice certification are no more expensive than other similar products.

Benefits:
Environmentally friendly, and low VOC products are healthier.

Household running cost savings					
Improved comfort and better health					
Increased capital value of the home					
Improved Homestar™ rating					

Talk to your builder/tradesperson about...

- » Specifying Environmental Choice certified products and low VOC paints and finishes.

Note: Keep invoices and supplier information for Environmental Choice products used in your rebuild to claim points for a Homestar™ certified rating.

Next steps:

1. Investigate using Environmental Choice products in your rebuild.

