Create an energy efficient new home or renovation

5 ACTION SHEET

There's no better time to think about energy efficiency than when you're building or renovating. It is when you can go back to the drawing board to really incorporate energy efficiency into your design.

For little or no extra cost, you can create a home that's warmer, more comfortable and more cost-effective to run for years to come – and you don't have to compromise on style to do it.

Designing for energy efficiency also means your home will use less of the world's energy resources, so you'll leave a better legacy for generations to come.

Get the energy efficiency experts involved

Working with designers, architects and builders that understand energy efficiency design principles – particularly designing for the sun – can really make a difference.

A good designer will recognise how the different components in a house work together to create a home that's more comfortable, yet cheaper to run. Not all designers, architects and builders are experienced with this, so it pays to shop around and seek references.

To maximise the energy efficiency and comfort of your new home you can also get its energy efficiency performance modelled while it is still in the planning and design phase. Doing this pre-build lets you understand the impacts of your design choices, and identify ways the design can be optimised, for a relatively small cost. For a list of qualified home energy rating assessors, visit www.absa.net.nz.

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Key features of energy efficient design

This home has been designed to maximise warmth and comfort while minimising energy requirements. Check out the key features of energy efficient design.

A sunny site

- The building site is sunny and sheltered from prevailing winds.
- The home is on the sunniest part of the section.
- There are no objects that can shade the home in winter (e.g. trees, hillsides).

North-facing

- The home is elongated along the east-west axis to maximise north wall areas.
- Most-used rooms – like living areas – are on the north side so they get more of the sun's light and heat.
- Less-used rooms – like bathrooms, laundry and garage – are on the south side.

House shaped to minimise heat loss

- A simple, two-storey design minimises the home's surface area, so there is less surface area to lose heat.

Plenty of insulation

- Walls and ceiling are insulated to levels higher than those specified by the Building Code to make it more comfortable to live in and cheaper to heat properly.

Tip: if you're taking wall lining off during a renovation, it's a great time insulate your walls.

Windows sized for direction

- Windows are moderately large on the north-facing side of the house to capture the sun's light and heat.
- East and west-facing windows are relatively small, and south-facing windows are even smaller to minimise heat loss while allowing incoming daylight and ventilation.

Tip: A lot of heat can be lost through windows if they are not sized properly for the direction they're facing, even with double-glazing.

Free heat with thermal mass

- A concrete floor exposed to the sun coming in through north-facing windows soaks up heat during the day and releases it at night.
- Areas directly exposed to the sun aren't covered with carpet or rugs, enabling the concrete floor to effectively absorb and emit the heat.
- The concrete slab floor is well-insulated, both underneath and around the perimeter, to hold in heat better during winter.

Think twice about recessed downlights

Many recessed downlights reduce the effectiveness of your insulation because large holes have to be cut in it for fire safety reasons. There are lots of stylish, functional non-recessed lighting options to choose from instead.

If you have standard recessed downlights, consider replacing them with 'closed abutted' (CA-rated) type recessed fittings which can be insulated right up to (but not over). Better yet, replace them with non-recessed fittings which don't compromise your insulation at all.

Image courtesy of Whiteman Architects

Good quality double-glazing

- Glass has low-emissivity and contains an inert gas filling between the glass layers to make them better insulated.
- Aluminium window frames are thermally broken (i.e. they contain a low-conductivity barrier – typically plastic – between the joinery to reduce heat transfer).

Tip: Window frames made of insulating material like wood or PVC also reduce heat loss through windows.

Good ventilation

- Windows are sized and located to allow good, natural ventilation that maintains air quality, removes moisture and keeps the house cool during summer.
- Kitchen fans, bathroom fans and dryer are all externally vented to prevent dampness inside.

Good airtightness levels

- Joinery and wall, floor and ceiling construction is well-sealed with special membrane systems (essentially high-tech building paper) in the floor, walls and ceiling.

Summer shading and cooling

- North-facing windows have well-designed shading from eaves and awnings to let the sun in during winter while keeping it out during summer.
- Deciduous trees shade west-facing windows to avoid overheating in the afternoon.
- Room layout and window placement is designed with cross-ventilation for summer cooling in mind.

Choosing energy efficient systems

Good design coupled with energy efficient systems will give you great comfort and convenience using less energy. Heating, hot water and lighting make up around two thirds of a home's energy use, so it's worth doing a little homework to get the right solutions for your home.

Clean, efficient hot water

If you're building or renovating, it is a good time to think about a new hot water system, and there are more efficient ways to heat water than with a traditional electric hot water system.

Choosing a hot water system that uses renewable resources like the sun (solar and heat pump water heating) or wood (wood or wood pellet water heating) will reduce your environmental impacts into the future. Gas (a fossil fuel) can also be used efficiently for a more environmentally-friendly result. ENERGYWISE™ action sheet 3 has more information on water heating.

Well-sized, efficient home heating

There is a range of efficient, effective heating options available these days, including ENERGY STAR®-qualified heat pumps, modern wood burners and wood pellet burners, and good flued gas heating.

For warmth and comfort using less energy, get your insulation sorted first and make sure your efficient heating system is sized, installed and used properly. ENERGYWISE™ action sheet 2 has more information on home heating options.

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Efficient lighting design

A good lighting design will match together fixtures, lighting controls and the most efficient lighting for the job to give you great looking, purpose-fit lighting that costs less to run.

A lighting designer can help you choose the right lighting solutions for your home. You can also try the virtual lighting design tool on the RightLight website.

Simply switching from conventional light bulbs to the most efficient light bulbs for the job will make a big difference to your lighting energy use.

Find out more

There is plenty of information available to help you incorporate energy efficiency into your new home of major renovation – check out these websites:

www.energywise.govt.nz
www.smarterhomes.org.nz
www.ecodesignadvisor.org.nz
www.consumerbuild.org.nz
www.dbh.govt.nz
www.rightlight.govt.nz

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