Sustainable Building

For more information visit www.sustainableliving.org.nz

Why Build Sustainably?

Good **design** can make your home warmer, drier and more comfortable and enjoyable to live in. It can also make it healthier and safer, cut your energy bills, save water and help the environment.
Find out how to maximise the energy efficiency of your home, and to use **materials** that have a low environmental impact and create a healthy living environment.

The Importance of Sustainable Design

To build sustainably be creative, make use of the growing range of information available and do some research so you can be confident when talking to architects, builders and your local council.

What works for you will depend on your **building site, climate, lifestyle requirements and budget**. Think about your options and make a list of your priorities.

Consider:

- Choosing a site
- Passive heating & cooling
- Thermal mass
- Energy efficiency
- Dampness and unhealthy air
- Water and wastewater management
- Safety and security
- Selecting a professional

Choosing Sustainable Materials

By choosing your building and home interior materials carefully, you can enhance the life of your home, reduce maintenance costs, and protect human health and the environment.

The best materials for your building and home interior will:

- Be sourced sustainably
- Be durable and strong enough to do the job required of them
- Create minimal environmental impact during manufacture or treatment
- Be non-toxic
- Be reusable or recyclable.

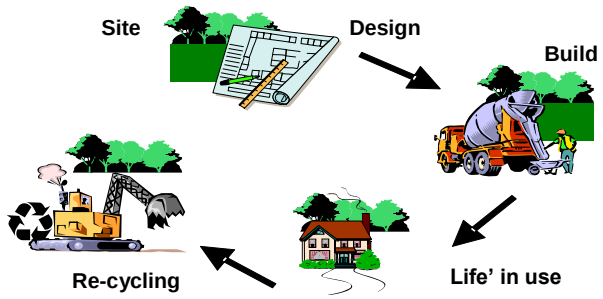
Thinking sustainability

A building material is unsustainable if it is extracted and used in amounts that will cause it to run out in future. When choosing building materials ask:

Do I really need it?
Can I use recycled materials?
How do I minimise the amount of waste?
Which materials can be replaced easily?
How do I build to last?

Looking at the whole life of a building product

A building's life cycle



'Life-cycle analysis' considers the total environmental impact of a material or product through every step of its life - from obtaining raw materials through manufacture, transportation, use in the home and disposal or recycling.

A life-cycle analysis will also consider a wide range of environmental impacts including:

- depletion of resources
- chemical degradation
- energy and water use (including embodied energy)
- greenhouse emissions
- waste generation
- toxicity to people and the environment.

A life-cycle analysis can be applied to a whole house, to an individual element such as a wall, or to a service such as heating or lighting.

When you are making decisions about design and materials you will need to think about:

- **Durability and functionality** – natural vs synthetic which may last longer
- **Construction systems –** eg the typical heavy concrete slab on the ground and lightweight framed construction above or options such as steel, straw bale, earth, timber and several forms of concrete.
- **Toxicity, emissions and health** - some paints, carpets, engineered timbers such as MDF, glues and textiles can contain volatile organic compounds which have been linked to health problems. Timber treatments use toxic chemicals such as chrome and arsenic that may leach out when exposed to weather.
- **Minimising waste** - avoid unnecessary use of materials. Ask your designer or builder about reducing waste when designing and ordering materials.
- **Recycled materials** - environmental impact is low, and they are generally cheaper. You may need to be a bit flexible with your design.

- **Sourcing sustainable materials** - look for eco-labels or environmental certification schemes that have government backing such as the Environmental Choice New Zealand label.

Check to see timber is certified as sustainable. This Forestry Stewardship Council logo is a useful guide.

Stay Warm in an Energy Efficient Home

When designing and building a new home, or renovating an existing one, think about making your home more energy efficient from the outset. **Passive heating** and **natural light** can reduce the amount of electricity or gas you use. So can **solar water heating** and **energy efficient appliances**.

Heating water is the biggest part of the power bill in many New Zealand homes. By fitting **low-flow showerheads** and choosing **water-efficient appliances**, you'll use less hot water.

Typical household energy use
- Water heating 30%
- Heating 30%
- Refrigeration 10%
- Lighting 10%
- Other appliances (includes standby losses) 20%

Insulation

The most significant step you can take to improve the energy efficiency and comfort of your home is to prevent heat loss in winter (and keep your home cool in summer) with insulation.

Types of insulation

Bulk insulation - traps air in still layers.
Reflective insulation - reflects radiant heat.

When choosing insulation, consider products which:
- are non-combustible/fire resistant
- are vermin resistant
- meet new insulation standards 2008
- stay mould-free/will not rot
- make homes quieter
- perform well over time
- come with a Building Research Association of New Zealand (BRANZ) quality appraisal
- are easy to fit if you are doing it yourself
- are non-toxic/non-irritant
- won't sag over time
- breathe.

Where to install insulation

- Roof and ceilings, walls, floors, hot water cylinders and pipes.

Installation of insulation

- Proper installation is critical. Most importantly, gaps and spaces must be avoided.

PLEASE NOTE: *It is best to use an approved installer for underfloor insulation because of the risk of electrocution if staples strike live cables. Their experience reduces risk.*

Glazing

- choose energy efficient double glazing and
- reduce glazed areas in South & West of your home, relative to North & East.

New insulation requirements

New, tougher insulation requirements will apply throughout NZ by the end of 2008. Investing in insulation will cost more initially (approx $3 – 5000), but costs will be recovered in 3 – 7 years. After that, for the rest of the building's life, you will benefit from savings in energy costs.

Solar heating

By harnessing the sun's energy to heat your water, you can minimise your electricity bills. Capital cost is fairly high.

Heating

A warm home is vital for comfort and health - the World Health Organisation's recommended minimum indoor temperature is 18°C.

Which heating system is right for your home?

Electric heaters - portable and convenient but inefficient.
Gas heaters - energy efficient, but if unflued will produce water vapour and toxic fumes.
Open fires - very inefficient, can be a health hazard.
Woodburners and pellet burners - wood is a renewable fuel but does emit smoke particles (health hazard).
Heat pumps - very energy efficient, expensive to install.

Where to Find Out More

There are many guides to help you find out more about **sustainable building design and materials**.

- www.consumerbuild.org.nz/publish/
- www.smarterhomes.org.nz/
- www.solarsmarter.org.nz
- www.level.org.nz/
- www.branz.co.nz/main.php?page=Sustainable%20Construction
- www.branz.co.nz/main.php?page=Eco-Building
- www.mfe.govt.nz/issues/urban
- www.sustainablehouseholds.org.nz/courses1.htm
- www.standards.co.nz
- www.waitakere.govt.nz/AbtCit/ec/bldsus/shsummary.asp
- www.waitakere.govt.nz/AbtCit/ec/bldsus/index.asp
- www.climatechange.govt.nz
- www.seattle.gov/dpd/GreenBuilding/SingleFamilyResidential/Resources/RemodelingGuides/default.asp
- www.nzia.co.nz
- www.rebri.org.nz
- www.wanz.org.nz/
- www.cca.org.nz/toplevel_files/welcome.htm
- www.greenbuild.co.nz

In addition, for further information about **energy efficiency**, visit:

- www.consumer.org.nz/
- www.eeca.govt.nz/residential/index.html