your Home

An independent guide to improving your home

Renovator's Guide

Free guide!

Briefing templates for your:

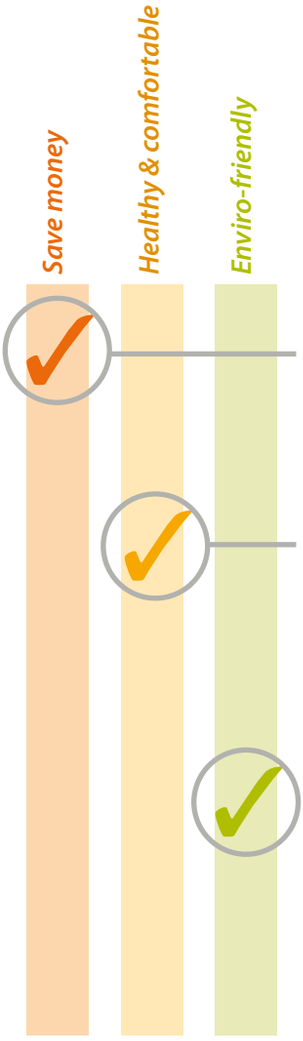
- Designer/Architect
- Builder/Trades
- Garden/Outdoor contractor

Tips and checklists for:

saving money ✓

a healthy, comfortable home ✓

an environmentally friendly home ✓



What's in this guide?

On each page you'll find:

Tips for saving money

A tick here indicates a cost saving opportunity. There are many simple things you can do that will save money on bills and maintenance costs, which in turn can improve resale value. There are even some things you can do that will save on upfront costs.

Tips for making your home healthy and comfortable

A tick here indicates an opportunity to make your home healthier and more comfortable. Keep warmer in winter and stay cooler in summer, all without the need for expensive heating or air conditioning. Make your home a safe and easy place to live for people of all generations and abilities. Avoid low level toxic fumes from building products, as well as other hazards that can affect safety and wellbeing.

Tips for being more environmentally friendly

A tick here indicates a chance to make your home environmentally friendly. Recent research shows Australians are becoming more environmentally aware and see home improvements as an opportunity to 'do the right thing'. There's really no distinction between good design and environmentally friendly design, and there's a huge range of innovative 'green' products now available. Why not go for a stylish, comfortable home that doesn't cost the earth!

Find more information

Look up Your Home Technical Manual too!

This guide is a companion to *Your Home Technical Manual* which contains over 60 information-packed factsheets on different aspects of home design and renovation, plus case studies from around Australia. It's all available free online at www.yourhome.gov.au. A print version of the Technical Manual is also available for purchase through the website.

On each page of this guide, you'll find pointers to the relevant *Your Home Technical Manual* factsheets so you can find out more.

www.yourhome.gov.au

Cover image RHS: Bart Maiorana

Renovator's Guide

Where do I start?

Renovating your home is an exciting process, but it can be daunting too. There's so much to consider, sometimes it's hard to know where to start.

Whether you're planning a major renovation or just upgrading your bathroom, this guide will help you get the most out of the process. You'll find helpful advice on creating a renovation that meets all your needs and provides the best value for money, now and for a long time to come.

1 Thinking through your needs

2 Designing your home

3 Making it happen

Briefing your:
Designer/Architect
Builder/Trades
Garden/Outdoor contractor

Getting started

Invest in your future

For most people a home is much more than a place to live, it's a long-term investment. Your renovation decisions will have important consequences for your future living costs and quality of life, so you want to get it right.

Times are changing rapidly and new issues need to be factored into smart investment decisions. This is sometimes called 'future proofing'—making sure your investment will hold its value over time.

When you're planning your renovation it's easy to focus on the short term, 'What can I afford right now?' But when you think about it, features that enhance resale value, improve comfort and reduce bills are worth paying a little bit more for now.

You can use savings on energy and water bills to pay off your mortgage faster. Some financiers offer lower interest rates (known as 'green' mortgages) or other financial incentives for home improvements that are designed to save precious resources like energy and water. Government rebates are also available to offset the purchase cost of many energy and water saving items.

'The first time we renovated, we made a few mistakes that really cost us. This time we're going to do our homework first.'

Plan ahead

Good planning is such an important part of ensuring value for money. Most renovation budget overruns are the result of poor planning—changing the design half way through, trying to fix up problems you didn't see coming, or simply failing to make the most of the opportunities presented.

Experienced renovators will tell you how important it is to plan ahead. This guide is designed to help you do just that, with prompts and handy tips on each page, as well as checklists you can personalise.

Write a wish list of everything you want from your renovation. This can include qualities such as 'light and airy' as well as more specific outcomes such as extra living space, an efficient hot water system or a more functional kitchen.

At the same time, take stock of what you've got—this step is so important for making the most of your renovation. An assessment of your home will identify the most cost effective opportunities for big improvements. It will also identify potential hazards so you can deal with them in the most cost effective way. Use what you find to develop and refine your wish list. You can use the 'home assessment' checklist on p 5 yourself, or go through it with your designer.

How much will it cost?

Renovation costs depend on many factors and can be hard to estimate. The Royal Australian Institute of Architects' *Archicentre Cost Guide* provides typical price ranges for different renovation components, and comes in very handy when planning your budget. Download it from the Archicentre website: www.archicentre.com.au/2008Jancost_guide.pdf.

Keep up with the competition

Home building regulations are getting smarter all the time. When you eventually sell your home it will be competing with new, environmentally friendly homes that don't cost as much to run. Use your renovation to get ahead of the game!

Saving with a 'green' home loan

Steve and Jodie saved 0.5% on the standard rate with a 'green' home loan. As Jodie explained, 'We wanted an energy saving home anyway, so qualifying was no problem. Now we have a better interest rate and lower bills—it's a double bonus!'

Save money	Healthy & comfortable	Enviro-friendly	**Tips**	**Checklist** for getting started
			Write your wish list. What do you really want from your renovation? Crosscheck this with your home assessment (see the checklist next page). As you write your list, decide whether each item is non-negotiable (no. 1 priority) or something you'd like if possible (no. 2 priority).	Non-negotiable: *(record your ideas & choices here)* Would like if possible:
✓			**Find out about 'green' mortgages.** Shop around to see what's on offer. Ask about green mortgages and other home improvement incentives.	Best offers:
✓			**Check if you're eligible for rebates.** Ask your local utilities, local council or state/territory government about rebates available to offset the upfront cost of energy or water saving features. Factor these rebates into your budget. The Alternative Technology Association website also has information on rebates: www.ata.org.au.	*Item:* / *Rebate available:* Bathroom fittings: $ Hot water system: $ Insulation: $ White goods: $ Rainwater tank: $ Greywater system: $ Photovoltaic system: $ Other: $ **Total rebates: $**
			Leave a contingency in your budget. Cover yourself for extras you don't expect. It's wise to add 5–10% extra.	Estimated budget: Extra amount we'll set aside for unexpected costs:
✓			**Budget for the long term.** Think about your bills. Factor ongoing savings and improved resale value into your budget decisions.	Items that will save on bills and enhance resale value:
✓	✓	✓	**Do your own 'home assessment'.** This is important for identifying the best opportunities, as well as problems that need to be dealt with!	See the 'home assessment' checklist on p 5.

'Future proof' your home

Protect yourself against rising energy, water and fuel costs by ensuring your home saves energy and water and is close to everything you need. Choose long lasting, durable materials that don't need a lot of maintenance. Design in features that will make your home safe and easy to live in when you're older. All of this can improve resale value.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.ata.org.au – Energy and water rebates

www.archicentre.com.au/2008Jancost_guide.pdf – Renovation cost guide

www.archicentre.com.au/html/downloads.html – Other useful information



Assessing your home

Save money

Look around for opportunities to save money. Do you really need to extend out or up, or do you just need to re-design your interiors for better use of space? If you plan to demolish sections of the house, are there building materials like windows, doors, floorboards or interior fittings that you can reuse elsewhere, sell or even give away?

Look for opportunities to lock in ongoing cost savings too! To save on energy and water bills, find out where you're using more than you need to—check your current bills and see the tips on the opposite page or visit the NABERS website. In some locations there are companies who can come to your home and do a professional water and energy assessment to identify the best ways for you to save on bills. As well as saving money you'll be helping the environment. *[See Your Home: Energy use, Introduction; Water use, Introduction.]*

Improve comfort

Make a note of rooms that are too hot or too cold at different times. A few simple design improvements could make the world of difference to your comfort. If you use a lot of heating or cooling to stay comfortable, your renovation is a chance to ensure lifetime savings on bills.

'Getting a water and energy assessment was the best thing we ever did. It saved us much more than it cost us!'

Take the opportunity to insulate walls and double glaze windows. Many older homes are draughty. Add draught-proofing strips to doors and windows and check that new windows and doors have good seals. Fit dampers to chimneys and flues to block air leaks. *[See Your Home: Passive Design, Introduction.]*

Now's your chance to fix up problems like dust, damp and mould. Look for opportunities to make your home safer and easier to move around in for occupants and visitors of all ages and abilities. *[See Your Home: The healthy home; The Adaptable House.]*

Be prepared

If you see warning signs that may indicate structural problems or other hazards, seek professional advice from an architect, engineer or builder. Signs could include:

- major cracks in walls, around doors or windows
- dampness on walls or coming up through floors
- signs of termites, such as damaged timber.

Pre-1970s homes are likely to have lead-based paint so if you're removing it follow the advice in the *Six step guide to painting your home* (www.environment.gov.au). Homes built pre-1990 may contain asbestos. It's commonly found under eaves, but may also be found as roofing, wall linings and cladding. If you suspect you have asbestos contact your local council or state health and environment authorities for more information. Removal is not always recommended, but if it is removed, it needs to be done by a specialist. Asbestos removal contractors are listed in the *Yellow Pages*. *[See Your Home: The healthy home.]*

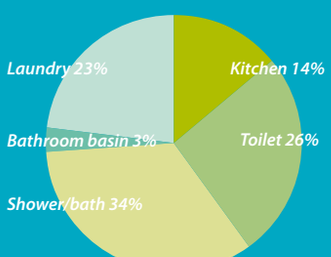
NABERS HOME

How do you rate?

Use the NABERS website to compare your energy and water bills to the average home. You'll also find interactive tools that help you identify the best energy and water saving opportunities for your particular situation. See www.nabers.com.au.

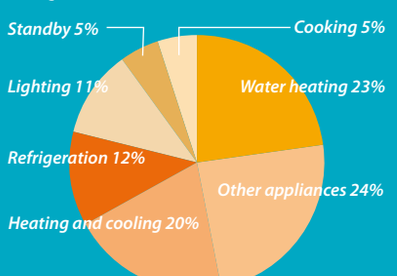
Indoor water use

Average Australian home. Source: ISF.



Greenhouse gas emissions

Average Australian home. Source: Your Home.



Small changes make a big difference

Kim's home assessment revealed some big opportunities. After installing a 3-star showerhead and new ceiling insulation, and turning off the second fridge, the improvements were obvious.

Save money	Healthy & comfortable	Enviro-friendly	**Tips**	**Checklist** for your home assessment
✓		✓	**Identify products you can reuse.** For example doors, windows, timber, cabinets etc.	Products and features we can reuse:
✓	✓	✓	**Note uncomfortable rooms.** Tell your designer so they can suggest modifications to improve the existing part of your house as well. If you can easily access your roof space, check for insulation. Also check for draughts.	Rooms that are uncomfortable or in need of lots of heating or cooling: Ways we can improve this:
✓		✓	**Upgrade bathroom fittings.** Replace your showerhead if it almost fills a 10-litre bucket in under a minute. Upgrade single flush or old dual flush toilets.	New water saving showerhead (3-star) . . . . . ☐ New water saving toilet (4 or 5-star) . . . . . ☐ Other water savers:
✓		✓	**Check your hot water system (HWS).** You may need professional advice. Electric storage models have the highest greenhouse impact—if you have one consider an upgrade. See pp 24–25 for tips.	Type of new HWS we're considering: HWS located close to hot water tap we use most . . . . ☐
✓		✓	**Fix leaks.** Check your water meter when nobody's using water in your home. If it's running that's a sign of a leak. Vegetable dye in the cistern will make toilet leaks easier to spot—or turn off the tap to the toilet and see if the water in the cistern disappears.	Leaks to be fixed:
✓		✓	**Reduce the energy use of your lighting.** Save money by replacing incandescent bulbs with warm white fluorescent bulbs. See the tips about halogens below. Make sure outdoor lights have movement or daylight sensors.	Swap incandescent bulbs for fluorescent . . . . . ☐ Swap 50W halogen bulbs for lower wattage . . . . . ☐ Swap halogen bulbs for LED . . . . . ☐ Put isolators above recessed downlights . . . . . ☐ Add sensors to outdoor lights . . . . . ☐
✓		✓	**Upgrade inefficient appliances.** A home audit professional or the NABERS website tool can help you identify which appliances to upgrade. Choose new products with the highest star rating in the size you need.	Appliances to upgrade:
	✓		**Identify signs of hazards.** For example termites, dampness, asbestos, structural problems.	Signs of hazards: People we need to talk to for expert advice:

Did you know?

Rooms with a lot of low voltage halogen downlights chew up electricity—low voltage doesn't mean low energy! If you're happy to replace the whole system, ask your electrician for compact fluorescent or light emitting diode (LED) downlights, or see pp 24–25 for other options.

Recessed downlights are like having holes in your ceiling. They let a lot of heat escape in winter. But now you can buy isolators that sit over the fitting above the ceiling and reduce the air flow and the fire hazard.

Useful websites

www.environment.gov.au – Six steps to painting your home

www.lead.org.au – General advice on lead products

www.energyrating.gov.au – Energy star ratings of appliances

www.waterrating.gov.au – Water star ratings of appliances

www.nabers.com.au – NABERS home assessment tool

Finding more information

Do your homework

The process of doing a home assessment and writing your wish list will bring up many questions. Fortunately, there are many places you can go to find information.

Your Home Technical Manual contains over 60 factsheets with tips on sustainable home design. Each page of this guide points you to relevant factsheets, case studies and other useful websites. *Your Home* is free online at www.yourhome.gov.au.

Magazines, building advisory services and home ideas centres can also provide inspiration. Talk to friends who've renovated and learn from their experiences—what do they love about their renovation, and what would they change? Where did they find the most useful information? What traps did they fall into?

Your local council or state government departments and agencies can also provide handy information on renovating, and are often the place to start.

Play by the rules

Your renovation will need to comply with a range of building regulations. It's important to find out about regulations early on, so you can factor them into your planning. This contributes to a smoother approval and construction process.

'Without our designer, we wouldn't have had half of these great ideas!'

Your local council will be able to inform you about government building regulations and approval processes. If your home is subject to estate covenants or body corporate requirements, now is the time to check those too. If you plan to engage a designer, they can help you find out about regulations.

Although it depends on the scope of your renovation, you're very likely to have to comply with energy and water saving regulations. These have been introduced as a response to environmental problems that affect us all, such as drought and climate change. Older homes with heritage value may also be subject to heritage regulations. Remember, these regulations are just minimum requirements. You can always do better.

Bring in the experts

It pays to engage a qualified designer or architect, especially if your renovation will be complex or challenging in any way. Clever thinking at the design stage pays huge dividends later on. Your design professional may be able to manage the whole renovation process for you, potentially saving you a lot of headaches! Some companies offer design, project management and construction services all in one.

Once you have a shortlist of designers, ask to see their previous work or even talk to previous clients. Make sure they understand your priorities—fill out the briefing template in the back of this guide and talk it through with your designer.

Finding your designer

One of the best ways is through word of mouth—ask friends who've renovated. Look through home magazines for examples you like, as they will usually list the designer. The Royal Australian Institute of Architects' *Archicentre* service provides advice and information on renovating, and is a great way to find an architect. The Building Designers Association has a *Find a Designer* website.

Go for green!

Remember that the regulations are minimum requirements. There's nothing to stop you doing better—especially if it saves on running costs or adds value to your renovation. Some local councils may 'fast track' applications that have made an effort to exceed regulatory requirements and embrace environmentally friendly design.

Finding the right expertise

'It was a bit daunting at first, just figuring out where to start. My building information centre had great product information, but I really needed to talk to someone to put it all into perspective. So I visited Archicentre for a customised home renovation report.'

Save money ✓ | Healthy & comfortable ✓ | Enviro-friendly ✓

Tips

Gather information. Check *Your Home Technical Manual*, go to local building information centres, talk to friends, and check out the websites in this guide.

Find out about regulations. Check at your local council. They'll be able to tell you about local, state and Commonwealth regulations. If estate or body corporate requirements apply, list them too.

Find a designer. If you're looking for a designer, ask friends who've renovated for advice or use the websites below.

Checklist for finding more information

Questions and information needed:

Government regulations:

Estate or body corporate requirements:

Shortlist of designers we'll talk to:

Useful websites

You'll find a wealth of information on the internet—it's well worth setting aside some time to visit the websites listed in this guide. For example:

www.yourhome.gov.au is full of tips and ideas plus renovation examples from around Australia

www.ecospecifier.org has a list of environmentally friendly products and materials (subscribe for a short period)

www.ata.org.au has information about rebates you may be eligible for

Be clear about your priorities

Use the checklists on each page to start thinking about what you want for your renovation. You can then fill out the briefing templates at the back of the guide, to ensure your designer and builder understand your priorities. For items you really want, shop around for quotes and make sure the product details go into the specification that your designer will prepare.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.archicentre.com.au – Find an architect

www.findadesigner.com.au – Find a building designer


Design Habitat

Working with your designer

Briefing your designer

See the 'Brief for Architect/Designer' template in the back of this guide.

Use your wish list, home assessment and the information you've gathered so far to fill out the briefing template for your designer. This provides a starting point for discussion and ensures your designer is clear on your priorities. Sometimes it's helpful to show your designer magazine photos of homes you like (and don't like!) to give them an idea of the style and feel you want.

Your designer will be able to help you through the planning and building approvals process and prepare all the documents required, including drawings and a specification. After approval is granted many people engage their designer to develop more detailed drawings for the builder—covering, for example, design of built-in furniture or fittings, joinery and other interior details. This is particularly common for large or luxury renovations. You can also engage your designer to manage the builder and the construction process.

'All we did was re-plan our living space, but it feels like a new house!'

What goes where?

If you have the chance to re-plan space, particularly if you're extending, it's worth trying to face rooms in the optimal direction. This can improve comfort and natural light and help save energy. If this isn't possible, you can still get good outcomes by focusing on other aspects of design.

- The north side of your home is warmer in winter and the best place for rooms you use a lot during the day, like living areas.
- The west side gets hot in the afternoon and is best for rooms you don't use often, like bathrooms, laundries and garages.
- The south side is the coolest and good for bedrooms in warmer climates, as well as rooms you use less often.
- The east side gets morning sun and can be good for kitchens and bedrooms.

In tropical climates, above the Tropic of Capricorn, the approach is quite different. If you can, face living areas and bedrooms to capture cooling breezes and shade the whole house.

Group together the rooms you heat or cool most often, and ensure they can be closed off from other rooms. This way you just heat or cool the rooms you need. Keep wet areas like bathrooms, kitchens and laundries close together if you can, to save on plumbing costs and avoid wasting energy and water. Now is also the time to think about the best place for hot water systems, rainwater tanks and solar panels—see the tips on the facing page.

[See Your Home: Orientation; Passive solar heating; Passive cooling; Heating and cooling.]

Be a good neighbour

Your designer will help you come up with a renovation that optimises outcomes for both you and your neighbours, taking into account issues like privacy, noise, views and access to winter sun.

Less can be more!

Do you need extra space, or just more functional space? Asking questions like this upfront can save you a lot of money and hassle. Sometimes removing a wall or redesigning your interiors is all that's required, leaving you with more usable space indoors—and also more garden space.


Bart Maiorana

Clever design works wonders

'Just by removing the wall between the living room and kitchen, we got northerly exposure for the living room and much better natural light. The space suddenly feels much bigger.'

Save money | Healthy & comfortable | Enviro-friendly

Tips

Plan space efficiently. Don't build more than you need—after all, you're paying for it! Do you need extra space or can you re-organise what you have?

Face living areas north if you can. North-facing windows get sun for the longest part of the day in winter and are easy to shade in summer. A moderate amount of glass is great for comfort and natural light.

Design for safety and access. Make your home safe and easy to move around in—especially handy if you have young kids, or elderly relatives who visit.

Close off rooms you heat and cool from other rooms. You can still achieve an 'open plan' feel using openable doors or partitions.

Group wet areas together and locate the hot water system (HWS) nearby. This saves on plumbing and reduces the amount of water going cold in the pipes.

Find the best place for rainwater tanks. Keep plastic tanks away from direct sun, as this can cause algae growth. See p 30 for more on rainwater tanks.

Find the best place for solar panels. Face them north for best outcomes and make sure they're not overshadowed. *[See Your Home: Photovoltaic systems; Hot water service.]*

Checklist for your home design (1)

Activities we need more space for:

Rooms or areas to be re-planned:

Rooms or areas to be extended:

Glass in our living areas faces mostly north* . . . . . ☐
(close to north is fine)
*In tropical climates, instead face windows to capture cooling breezes, and shade them.

Safe and easy access into the house . . . . . ☐
No level changes on the ground floor . . . . . ☐
Easy access to living areas and bathroom . . . . . ☐

Rooms we use a lot and heat or cool:

Can they be closed off from other rooms?

Wet areas located together . . . . . ☐
HWS adjacent to wet areas . . . . . ☐
If wet areas aren't together:
HWS near the hot tap we use most often . . . . . ☐

Tanks below ground . . . . . ☐
Tanks above ground . . . . . ☐
Best location for tanks:

Solar hot water panels—best location:

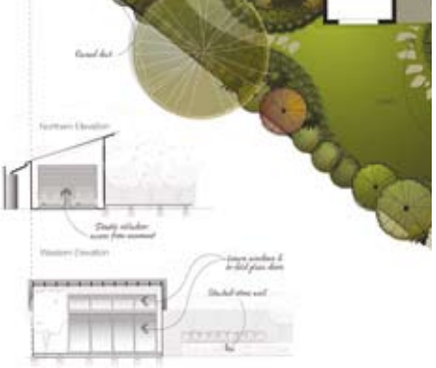
Photovoltaic (solar electricity) panels—best location:

Think ahead

Design in features that will make your home a safe and easy place to live as you grow older, like paths, entries and showers without steps. This is especially handy if you have small children, or elderly or less mobile visitors. Lever door handles and taps are easy for people of all ages and abilities to use. These features could also make your home attractive to a wider range of people when it comes time to sell.

Useful websites

www.yourhome.gov.au – Guide to good home design



Working with your designer

Tips for good design

Designing your renovation to work with your climate—not against it—is a cost effective way to stay comfortable and save on energy bills. This is where a good designer can really help. Your climate will influence what kind of construction materials you should use, as well as other aspects like floor plan design and how much glass, shading and insulation you need. *[See Your Home: Design for climate.]*

Save money and get that light and airy feel indoors by designing to make the most of daylight. This can be done by facing living rooms towards the midday sun where possible and by using light-coloured paints and finishes inside the house. This means facing north, unless you live above the Tropic of Capricorn. *[See Your Home: Lighting.]*

Many renovators are now choosing to 'future proof' their homes through environmentally friendly design and product choices. There's a huge range of innovative products available, from insulated wall panels made from recycled ingredients, to natural paints, to cement that's much less energy-intensive to manufacture. These products look no different to 'standard' products, and many are cost competitive. You can find a wide range of these products on the ecospecifier website.

'We were amazed to find such a range of cost effective, environmentally friendly products.'

Ask your designer to include your choices in the specification. See pp 20–31 for more on choosing products. *[See Your Home: Material use, Introduction.]*

Glass gives a wonderful open feel to a home and lets in natural light, but it can create comfort and glare problems. Glass is the path of least resistance, letting out over 10 times more heat in winter and letting in more than 100 times more heat in summer than a typical insulated wall. Use a moderate amount of glass in your renovation and choose energy efficient windows, glass doors and skylights—see pp 20–21 for product selection tips. Put most glazing on the north side where possible, unless you live in northern Australia.

Shading glass is very important to keep rooms cool in summer. Eaves work really well on the north and south sides because they keep out summer sun and let in winter sun. Adjustable shutters, external blinds or vertical trellises that block low sun in summer work best on the east and west. Close-fitting curtains and blinds help keep warmth inside and heat outside, as do double glazing and special glass coatings. *[See Your Home: Glazing; Shading.]*

Although you don't see it, you'll feel the impact of good insulation every day. Your home will be quieter and more comfortable, plus you'll save money on energy bills. How much insulation you need depends on your climate, but even in the mildest climates homes need good insulation to be comfortable. You'll also need extra insulation if you have central heating or air conditioning, to keep in the warmth or cool. In all climates you need roof, ceiling and wall insulation. Whether you need floor insulation depends on the climate and type of floor. *[See Your Home: Insulation.]*

How to 'retrofit' insulation

Insulation is really easy to retrofit in some places—for example in roofs and ceilings where you have easy access to the roof, or under raised floors. It's harder to retrofit into walls or raked ceilings, but if you're already removing linings or external cladding take the opportunity to add better insulation. Rebates may be available.

If you don't have roof or ceiling insulation—many old homes don't—installing it will really make a difference! Up to 35% of a home's heat loss or gain happens through the roof and ceiling. Make sure you have shiny foil insulation under the roof as well as ceiling batts. (In naturally cooled homes in tropical climates shiny foil insulation on its own may be enough.)

Exploring the options

'Our designer sat down with us and went through all the products we wanted to use, to identify similar, more environmentally friendly options. Many of them were cost competitive, so we thought—why not!'

Save money	Healthy & comfortable	Enviro-friendly	Tips	**Checklist** for your home design (2)
	✓	✓	**Consider environmentally friendly products.** Most are cost effective and look no different to 'standard' products. Some options are outlined on pp 20–31. You can find out more from the Your Home, ecospecifier and Good Environmental Choice websites.	Green building products we're considering: Green interior products we're considering: Green appliances and technologies we're interested in: Quotes we've obtained for these:
✓	✓	✓	**Maximise natural light indoors and design lighting efficiently.** Think carefully about where you'll place windows and skylights, and use light colours indoors. Ask your designer for energy efficient lighting design, in terms of both lighting layout and product selection.	Rooms we use a lot have good natural light . . . . . ☐ Our indoor surfaces are mostly light-coloured . . . . . ☐ Lighting layout and design is energy efficient . . . . . ☐
✓	✓	✓	**Use a moderate amount of glass.** Avoid excessive amounts of glass. See *Your Home* Passive solar heating factsheet for some basic rules of thumb.	Could we reduce the area of glass to make rooms more comfortable? Where?
✓	✓	✓	**Shade all glass from summer sun.** Don't put up with heat or pay for cooling if you can use shade instead. Above the Tropic of Capricorn you'll also need to shade the south side. Properly designed eaves or adjustable horizontal devices can provide adequate shading to the north and south.	Type of shading—north side: Type of shading—east and west sides: Is shading required on the south side?
✓	✓	✓	**Use double glazing if you heat or cool your home a lot.** Double glazing can add a bit to the cost, and double glazing existing windows can be labour-intensive. However, your lower bills are likely to make it worth the effort!	Existing windows, doors or skylights to be double glazed: New windows, doors or skylights to be double glazed:
✓	✓	✓	**Install good insulation and seal draughts.** Retrofit insulation if your home assessment showed that rooms are uncomfortable, or if existing insulation levels are inadequate. Seal any draughts. Use good insulation in all new construction—you'll feel the difference!	Places where we could 'retrofit' insulation: Most important places to insulate first: Places we need to draught-proof:

Make old windows perform!

To keep warmth in, ask your carpenter to fit an extra pane into the frame. Removable plastic films are also available as a cheaper alternative to double glazing. In summer, external shading makes a huge difference. Applying a solar control film is the next best option, but can reduce light levels indoors.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.ecospecifier.org – Sustainable building products guide

www.geca.org.au – Good Environmental Choice products

Room by room

Bathrooms and laundries

Here's a great opportunity to add value to your home and save lots of water without having to compromise a thing.

Check for leaks and fix them right away—a leaking toilet can waste up to 95,000 litres of water a year! It's definitely worth replacing an old water-guzzling showerhead with a water saving model. They're inexpensive, there's a huge range available, and they will save the average household around $100 in water and energy each year. You can also add flow regulators or aerators to make taps more efficient.

Replacing a toilet is more expensive, but worth it if you have an inefficient model, particularly if it's single flush. Save at least 15,000 litres of water a year by choosing an efficient 4-star model; there are many stylish options to choose from. Now you can also get a 5-star model with a sink over the cistern—particularly useful where space is tight.

Avoid baths that are bigger than you need, as they take more water to fill. Spas also use more energy than regular baths.

'Our new front loader saves us 70 litres a wash.'

The washing machine is one of the biggest users of water in the home. A 4.5-star front loader can save you 70 litres a wash, compared to the average. Consider using a clothes line instead of a dryer, to save money and laundry space. If an outdoor line isn't an option, choose a space-saving, folding indoor clothes line.

[See Your Home: Reducing water demand; Low impact toilets.]

It's usually possible to get a great new look without ripping everything out. Are there tiles in good condition that you can leave, focusing on simpler changes like painting walls or changing fittings? Could you have your old bath re-finished instead of buying a new one?

Designers usually recommend predominantly light, neutral colours for permanent finishes like tiles, and bolder accent colour where it's easier to change, like on painted walls or by using decorative objects. This way if you tire of the colour you can update it cost effectively. Use slip-resistant tiles, as well as moisture-resistant bathroom cabinets and joinery. Having windows that open for ventilation is cheaper and quieter than relying on an exhaust fan. Your rooms will have a light, airy feel and you'll save on electricity.

After you've locked in ongoing water savings with your bathroom fittings, consider going further by using rainwater or greywater to flush toilets or in the laundry. See pp 30–31 for more information.

[See Your Home: Rainwater; Wastewater reuse.]

Go star-spotting

The biggest water users inside a home are the shower, toilet and washing machine. Look for the water star label— the more stars, the better the water savings.

Accessible bathrooms

While you're renovating, it's a good chance to make some changes to your bathroom that will make it safe for elderly or less mobile visitors, and attractive to a wider range of potential buyers. There are simple things like reinforcing walls so you can add grab rails later, using slip-resistant tiles, avoiding sills on showers and designing in generous movement space.

[See Your Home: The Adaptable House.]

Take advantage of rebates

Tina shopped around for bathroom fittings, looking for the best star ratings she could find. 'We wanted to take our water savings even further', she explains, 'so we use rainwater to flush the toilet. We would have done this anyway, but the rainwater rebate made it all the easier.'

Save money	Healthy & comfortable	Enviro-friendly	**Tips**
✓		✓	**Reuse what you can.** Think before you rip out everything—what's worth reusing?
✓		✓	**Upgrade inefficient toilets.** Especially worth it for old single flush models.
✓		✓	**Replace water-wasting showerheads.** If you're not sure, do the 'bucket test' (see below).
✓		✓	**Upgrade inefficient washing machines.** Old top loaders are generally the biggest water-wasters.
	✓		**Design in safety features.** You'll be able to accommodate elderly and less mobile visitors, and broaden resale appeal.
✓	✓	✓	**Ensure joinery is moisture-resistant.** This improves durability. Your joinery will remain in good condition for longer.
✓	✓	✓	**Design in good ventilation.** Use a window or small skylight for ventilation instead of relying on an exhaust fan—but remember to close it. Exhaust fans should have a self-closing shutter and a timer to switch the fan off after you leave the bathroom.
✓		✓	**Check for leaks and fix them.** This applies to old fittings you're keeping. Also check new fittings once they're installed.
		✓	**Connect up to rainwater or wastewater.** Using rainwater indoors is more effective than only using it on the garden. You may also decide to use treated greywater indoors in the laundry or to flush toilets.

Checklist for bathrooms and laundries

Fixtures and finishes to retain:

New 4-star toilet . . . . . ☐
New 5-star toilet (integrated basin) . . . . . ☐

New 3-star showerhead or flow regulator . . . . . ☐

New front loader, 4+ star rating . . . . . ☐

Safety features to incorporate:
- Slip-resistant tiles . . . . . ☐
- Shower without sill or step . . . . . ☐
- Reinforced walls for future grab rails . . . . . ☐
- More space to move around . . . . . ☐

Moisture-resistant cabinets, shelves etc. . . . . ☐

Bathroom has an openable window . . . . . ☐
Laundry has an openable window . . . . . ☐
Self-closing exhaust fan with auto switch-off . . . . . ☐

Leaks to be fixed:

Rainwater or treated greywater will be used for:
- Toilet flushing . . . . . ☐
- Washing machine . . . . . ☐
- Other:

How greedy is your shower?

Do the 'bucket test' if you're not sure. Turn your shower on at full pressure. If you can almost fill a 10-litre bucket in less than a minute, your showerhead uses too much water and is worth upgrading to a 3-star model. A high star rating is a guarantee of water savings *and* a good shower.

Useful websites

www.yourhome.gov.au – Guide to good home design
www.waterrating.gov.au – Appliance water star ratings
www.smartwatermark.info – Outdoor water efficient products
www.energyrating.gov.au – Appliance energy star ratings

Room by room

Living areas

Surely the most lived-in part of your home deserves extra special attention! Clever design of space is crucial in a living area. It's how the space feels and functions that matters most, not how many square metres it is.

Design your outdoors as an extension of your living room, effectively getting more living space for free. If using sliding or folding doors, make sure they seal properly when closed. If you have young children, design kitchen and living areas to overlook play areas.

Use light-coloured surfaces to maximise natural light. Face glass north if you can (unless you live above the Tropic of Capricorn) so you get light for most of the day. If your living areas already face north this is easy. If not, your designer may still be able to find innovative solutions, such as skylights or high windows. In tropical climates above the Tropic of Capricorn, face living areas and openings to capture cooling breezes.

Make sure you have openings on more than one side of your living area, to allow cooling breezes through in summer. High openable windows or skylights work well to get rid of hot air as it rises, and let in winter sun. But make sure they're double glazed with good seals to keep in winter warmth. Choose skylights with built-in shading, unless your roof is already well-shaded.

'We love spending time in here, it's much more comfortable than it used to be!'

When living areas are too open, especially if they have mezzanines or high ceilings, they can be difficult (and expensive) to heat and cool. In all but the mildest climates, it pays to design living areas so they can be partitioned off from the rest of the house. *[See Your Home: Passive Design, Introduction.]*

Kitchens

It's often the kitchen that people fall in love with, and that's important if you're thinking about resale value. First, consider what's worth reusing in your old kitchen. Can you leave the cabinet carcass and just replace doors and benchtops? See the tips on pp 22–23 about choosing cabinets and benchtops.

A good kitchen gives you room to move but is compact enough to allow easy reach between different activities. Make sure it isn't a thoroughfare. Leave generous bench space between the sink and the cooktop, as this is the most convenient space for food preparation. Consider using drawers instead of cupboards for easier access. Locate dishwashers near sinks to allow easy loading. This also concentrates your plumbing in one space and saves money. Multi-bin sorters under sinks are a great idea—you can separate your rubbish for recycling straight away. For safety, avoid sharp benchtop corners and have at least one lockable cupboard for harmful substances.

The fridge usually uses more electricity in a year than any other appliance, so when replacing your fridge choose one with a high energy star rating. Make sure cabinets allow an air gap all around the fridge of at least 50 mm for good ventilation. See pp 24–25 for hints on choosing appliances. *[See Your Home: Appliances.]*

Do your health a favour

Paints, kitchen cabinets, floor varnishes and many other common interior products may contain ingredients known as 'volatile organic compounds' (VOCs) that give off low-level toxic fumes. These products continue 'off gassing' for months after installation, causing irritations and allergies. Good ventilation and indoor plants can help, but the healthiest solution is to use natural and 'low VOC' products. *[See Your Home: The healthy home.]*

The low-down on downlights

Downlights can look great, but if you go overboard it will cost you. Even if all your lighting is energy efficient, lighting a living room with 8–10 downlights uses about eight times the energy of a living room with one ceiling-mounted light in the centre. This is simply because with downlights you need more lights to do the same job! If you already have downlights and want to keep them, consider replacing them with energy efficient compact fluorescent or LED versions. *[See Your Home: Lighting.]*

A kitchen that doesn't cost the earth

This renovation used recycled timber flooring. The builder then used offcuts from the flooring to create the kitchen cabinets. Cabinet doors are inset with perforated steel panels, which were also salvaged from the demolition.

Save money	Healthy & comfortable	Enviro-friendly	Tips	Checklist for living areas and kitchens
✓	✓	✓	**Maximise indoor comfort.** Find ways to make living areas more comfortable—this will also save on energy bills! Ensure you can ventilate your home securely, using grilles or windows that can lock open. * Facing glass north is not so relevant for tropical climates.	Most glass will face north*. . . . . ☐ Openings on more than one side of rooms . . . . . ☐ Living rooms can be closed off . . . . . ☐ Draught-proofing installed if needed . . . . . ☐
✓		✓	**Make lighting energy efficient.** Installing more downlights than you need is a common mistake. 3 watts per m^2 is a good rule of thumb for laying out compact fluorescent downlights.	No downlights used . . . . . ☐ Only a few downlights used . . . . . ☐ Compact fluorescent lighting used . . . . . ☐
	✓	✓	**Design a functional, environmentally friendly kitchen.** There's a large range of stylish, environmentally friendly options available.	Parts of existing kitchen reused . . . . . ☐ Timber is plantation, recycled or certified sustainably managed . . . . . ☐ Rounded or bevelled benchtop corners . . . . . ☐ Lockable cupboard . . . . . ☐ Multi-bin sorter for recycling . . . . . ☐ Good ventilation around fridge . . . . . ☐
	✓	✓	**Use healthy interior products.** Use either low VOC products (good) or all-natural products (best).	Natural or low VOC paints and varnishes . . . . . ☐ Natural or low VOC kitchen cabinets . . . . . ☐ Indoor plants used to improve air quality . . . . . ☐
✓		✓	**Choose energy and water saving appliances.** Choose white goods with the best star rating available for the size you need. Gas cooktops produce less greenhouse gas emissions than electric cooktops (unless you use electricity from a renewable source).	Star ratings for our new appliances: Fridge energy stars: Freezer energy stars: Dishwasher energy stars: Dishwasher water stars: Cooktop will be gas . . . . . ☐
✓		✓	**Choose energy saving home entertainment equipment.** Compare the wattage of equipment when you're purchasing—the higher the watts the more energy it will use. Look for the ENERGY STAR label for low standby power consumption.	Home entertainment equipment we're considering: *Brand/size* | *Full power* | *ENERGY STAR* | | ☐ | | ☐ | | ☐

Energy eaters

When choosing home entertainment equipment, compare energy use both in full power and standby mode. Generally, the bigger the TV screen, the more energy used. Plasma screens tend to use more energy than LCD screens. There's a wide variation in efficiency—some products use more than three times the energy of others of similar screen size and type. Check the wattage before you buy and look for the ENERGY STAR label—an indication of low standby energy use.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.energyrating.gov.au – Appliance energy star ratings

www.waterrating.gov.au – Appliance water star ratings

www.energystar.gov.au – Energy efficient home electronics

Designing your garden

Go for the great outdoors!

See the 'Brief for Garden/Outdoor contractor' template in the back of this guide.

The best living spaces are those that flow from inside to outside, helping you make the most of 'alfresco' living. If you live in a warm or mild climate, building a shaded deck can be just as good—and much cheaper—than extending your living room.

Did you know that good landscape design can actually improve comfort inside your home? You can use plants and other landscape features to provide shelter from harsh winds, or channel cooling breezes into the house. Planting is also a great way to provide shade. Use evergreen plants wherever you want permanent shading, such as on west-facing walls in warmer climates. Deciduous plants and vine-covered pergolas work well on the north side because they provide shade in summer and let in winter sun. *[See Your Home: Passive design, Introduction; Orientation; Passive cooling.]*

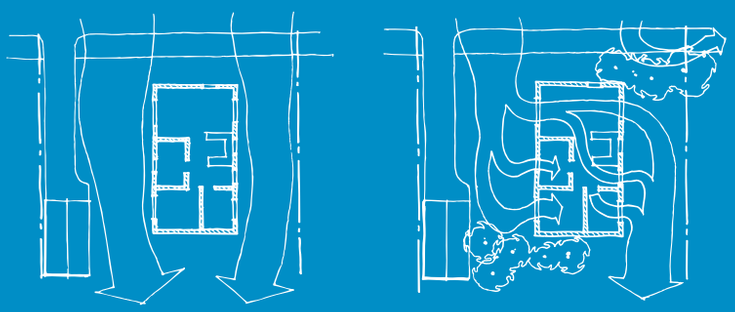
'Our vegetable patch is fantastic, we never run out of fresh herbs. I don't know why we didn't think of this earlier!'

Up to half the average home's water is used for the garden—of course the exact proportion will depend on your climate and whether there are water restrictions in place, as well as the type of plants in your garden. You can save a lot of water by choosing local native plants and groundcovers, which suit Australia's dry conditions. They also look great and attract native birds. Using mulch will help to keep moisture in the soil. In bushfire-prone areas plant fire-resistant species around the house. *[See Your Home: Outdoor water use; Biodiversity on-site; Sustainable landscapes; Bushfires.]*

It's important to plan your outdoor renovations upfront, just like you plan the indoors. Think about the best location for rainwater tanks and wastewater systems. If you do this early on, you have the chance to integrate them with the design instead of having them look like an 'add-on'. Also think about the best place for rubbish bins, recycling bins, compost bins or worm farms. Leave space for an outdoor washing line, so you can use the sun to dry your clothes for free. When planting trees, take care to place them so their roots won't damage walls or footings.

Use a mix of planting and paving, as too much concreting or paving can lead to pooling of water and drainage problems. Choose 'permeable' paving that allows rain to filter through to the soil underneath.

If you have a pool, shelter it from the wind and make sure it has a cover to prevent water and heat loss from evaporation. Check for leaking outdoor taps or irrigation systems. If you have an irrigation system, install moisture sensors so it remains off during rainy periods.



Landscaping can direct breezes through the house

Top outdoor water-wasters

- Pools without covers
- Lawns and exotic plants
- Leaking or inefficient irrigation systems


Bart Maiorana

A multi-purpose green wall

This 'green wall' does more than look good—it also treats greywater. Cleverly designed to fit within a small garden, the sand-filled planter boxes help to filter out impurities. This award-winning home uses 80% less water than it did prior to renovation.

For more information see the Clovelly NSW case study at www.yourhome.gov.au.

Save money	Healthy & comfortable	Enviro-friendly	Tips	Checklist for outdoor areas and garden
	✓		**Design a protected outdoor living area.**	Protection from sun: Protection from rain:
✓	✓	✓	**Use landscaping to improve indoor comfort.** See *Your Home Technical Manual* for more detail on techniques, or ask your landscaping consultant.	Landscaping will: Channel breezes into the house . . . . . ☐ Provide protection from harsh winds . . . . . ☐ Shade the house in summer . . . . . ☐ Details:
✓		✓	**Use local native plants and groundcovers.** Group plants with similar water needs together. Use organic mulch to keep in moisture.	Details of plants and groundcovers: Bushfire-resistant plants used *(if applicable)* . . . . . ☐ Mulch used . . . . . ☐
		✓	**Avoid too much impervious paving.** Use 'permeable' paving that allows rainwater to soak through.	Less than half of outdoor space is paved . . . . . ☐ Permeable paving used . . . . . ☐
	✓	✓	**Plan the locations for outdoor items.** This way spaces for bins and features like tanks and pools will appear as part of the garden design, rather than 'add-ons'.	Locations for: Rainwater tanks: Wastewater system components: Recycling bins: Compost/worm farm: Washing line: Pool *(if required)*:
✓		✓	**Install a pool cover.** This prevents water loss through evaporation. Installing it is the first step, but don't forget to use it!	Pool cover installed . . . . . ☐
✓		✓	**Avoid water wastage.** Check for leaks. If you have an irrigation system, ensure it's a water efficient drip system with moisture sensors.	Check for and fix leaks . . . . . ☐ Water efficient drip-irrigation . . . . . ☐ Moisture sensors . . . . . ☐

Tread lightly

A fantastic way to reduce your 'ecological footprint' (the amount of the earth's resources you use) is to grow your own food at home. A vegetable and herb garden will also save you money and provide you with fresh food on demand.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.livingthing.net.au – Sustainable gardening tips

www.sgaonline.org.au – Sustainable gardening tips

Working with your builder

Finding a builder or tradesperson

See the 'Brief for Builder/Trades' template in the back of this guide.

Your designer should be able to recommend good licensed builders* and tradespeople they've worked with before. Some professional associations for builders, plumbers and electricians have searchable databases on their websites. Many have now undergone 'green' training and accreditation to expand their skills.

Also ask friends who've renovated recently. When you're looking through magazines, check to see who built your favourite homes—they may be a local builder.

** In Victoria you should use a Registered Building Practitioner.*

Getting quotes

Create a shortlist of builders or tradespeople you will ask for quotes—it's always wise to get several quotes.

If you've engaged a designer, they will prepare the tender documents for your builder. This will include the drawings as well as the specification, which spells out the standards builders must comply with and any specifics relating to building products you want them to use. Be clear about what you want builders to include in their price and what's excluded.

'Our last builder tried to talk us out of the environmentally friendly products we wanted to try. Our new builder is all for it!'

Also ask about the start date and how long the work will take, as this can have budget implications too. The 'Brief for Builder/Trades' template can help you to communicate your priorities to your builder.

Choosing your builder

Once you've assessed quotes, you may want to ask your preferred builder if you can see some of their past work or talk to past clients, if you haven't already done so.

There are various contracts you can use when engaging a builder. Your designer can help you identify the most suitable one. Among other things, the contract will set out payment details. Payment is usually made in increments (called 'progress payments') when the builder finishes agreed stages in the renovation. The drawings and specification form part of the contract documents so it's important to get them right! If you want something, such as new skirting boards, but forget to include them in the drawings or specification, they will be charged as an extra.

During construction

Make sure your builder has a waste and recycling management plan detailing site management practices, such as recycling your demolition and construction material or, even better, finding innovative ways to reuse it. Your builder also needs to have measures in place to stop sediment from the site getting into the stormwater system or waterways. Good site management will keep your neighbours and the authorities happy, and avoid the risk of fines. Lock these requirements in at the contract negotiation stage. *[See Your Home: Sediment control; Waste minimisation.]*

Don't settle for less

After you've spent time getting the specification right, you don't want your builder or tradesperson changing products without your approval. Sometimes your builder will have a better idea you'll agree with, but other times you can end up with cheaper products you don't really want. Make sure you write into the specification that permission from you or your designer is needed before products are substituted.

Small jobs

If you're engaging a tradesperson for a small job you may not have drawings or a formal specification, but be as clear as you can (in writing) about the scope of work and any specifics relating to products. Use the briefing template at the back of this guide to help you. Ask for an itemised quote so you know exactly what costs what; this will help you compare different quotes.

Eco-friendly products can save energy

'We had no idea how much energy goes into making building products till now! Our builder gave us plenty of smart 'green' tips. He used recycled steel reinforcement, cement mixed with 'extenders' and recycled aggregate in the mix. Our floor slab used way less energy to make than it otherwise would.'

Save money | Healthy & comfortable | Enviro-friendly

Tips

Create a shortlist of builders. Ask around for advice or search online.

Create a 'tender package'. Your designer can help with this. Make sure the documents are clear about what builders should include in their price. Use the 'Brief for Builder/Trades' template to help.

✓ **Compare quotations.** Don't just go for the lowest price, take the time to go through the quotes in detail so you're comparing 'apples with apples'. Your designer can help you assess quotes.

Note which items in a quote are lump sum costs (these are fixed) and which are provisional costs (these can vary). Provisional costs are the builder's best estimate—be aware you could end up paying more or less depending on circumstances.

✓ ✓ **Find out about site management.** Before engaging your builder, ask about their site management practices, including those of their subcontractors. Ask who will check this is done each day.

Checklist for working with your builder

Shortlist of builders and other tradespeople we'll talk to:

Tender documents to go to builder:

- Drawings . . . . . ☐
- Specification . . . . . ☐
- Council building consent conditions . . . . . ☐
- Other:

Builder 1:	Price:
Start date:	Duration:
Comments:	
Builder 2:	Price:
Start date:	Duration:
Comments:	
Builder 3:	Price:
Start date:	Duration:
Comments:	

- Demolition material will be recycled . . . . . ☐
- Construction offcuts will be recycled . . . . . ☐
- Litter control measures will be in place . . . . . ☐
- Sediment control measures will be in place . . . . . ☐
- Site will be left secure and tidy at end of each day . . . ☐
- Other specific requirements:

DIY or leave it to the professionals?

For some renovators, the DIY path is a chance to use their own skills and save money. However, an owner-builder must accept the same responsibilities, liabilities and risks as a professional builder. For all but the smallest jobs you'll need domestic building insurance and an owner-builder certificate of consent. Make sure you understand all the legal requirements first.

Useful websites

www.yourhome.gov.au – Guide to good home design

Find builders and tradespeople:

www.masterbuilders.com.au – Accredited Green Living builders

www.greensmart.com.au – Accredited GreenSmart builders

www.ecosmartelectricians.com.au – Accredited electricians

www.greenplumbers.com.au – Accredited plumbers

www.enviroplumber.com.au – Accredited plumbers

Choosing building products

Windows, doors and skylights

Glass is the biggest path for heat loss and gain, so it really makes sense to choose energy efficient windows, doors and skylights. Look for the WERS (window energy rating scheme) label on products. The heating stars indicate how well it will keep in winter warmth. The cooling stars indicate how well it will protect you from unwanted summer heat. A 5-star rating is the maximum, and a sign of the best performance. Depending on your climate, you may choose to focus more on one than the other. For example, in tropical climates you'd focus on the cooling stars, and in cold climates you'd focus more on the heating stars. In most climates you really want to focus on both to maximise year-round comfort.

The WERS rating takes into account the glass and the frame. For a high heating star rating, you'd need double glazing and a timber or insulated frame. For a high cooling star rating, you'd need glass that's toned or has a solar control film. Double glazing also improves your cooling rating, and is particularly useful for air conditioned homes to keep the 'cool' in.

To encourage natural ventilation, choose windows that can be opened wide, and operable skylights. Just make sure they are airtight when closed.

'It's hard to believe what a difference these double glazed windows make! It's so comfortable and quiet in here!'

If you're choosing timber frames, look for timber that's from certified sustainably managed forests. Environmentally friendly options available include FSC-certified (Forest Stewardship Council) timber or plantation pine treated with LOSP (light organic solvent preservative). *[See Your Home: Glazing; Skylights.]*

Decking

Choose decking timber sourced from certified sustainably managed forests. Environmentally friendly options include many plantation timbers, FSC-certified timber and even composites made of sawdust and recycled plastic. If you're using plantation softwoods like pine they'll need to be treated with preservative. Ask your supplier about less toxic options like LOSP with linseed oil. *[See Your Home: Biodiversity off-site; The healthy home.]*

Insulation

The higher a product's R-value, the better it insulates. It's important to choose the right insulation for the job. There are two basic types: reflective insulation (the shiny foil) and bulk insulation (usually batts, rolls or boards). Some products combine both these types into one. Always follow manufacturers' installation instructions. If bulk insulation is compressed it won't work as well, and reflective insulation needs an air gap next to the shiny surface. Many environmentally friendly products are available. You can get products with recycled content, such as polyester, cellulose or bio-soluble glass fibre. *[See Your Home: Insulation; Insulation installation.]*

Keeping your cool

Toning and solar control films reduce heat gain through glass, but be aware that they can reduce natural light levels indoors and solar warmth in winter. External shading of windows is very effective, reducing heat gain by 70–85%. WERS is focused on the window itself and doesn't take shading into account, but don't forget to shade windows in summer!

It's easy being green

If you want a stylish home that's cheap to run and kind to the environment—and who wouldn't—try the ecospecifier and Good Environmental Choice websites. Ecospecifier allows you to search for and compare over 3,500 environmentally friendly products, from building materials to interior finishes to rainwater tanks. Make sure your designer subscribes to ecospecifier. If you want to search for products yourself, short-term subscriptions for 'home users' are available.

Smart product choices

For his renovation Andrew chose windows with LOSP-treated (light organic solvent preservative) finger-jointed pine frames. 'The frames are pre-primed, which is great when it comes to painting' he explains. 'I used argon-filled double glazing for better insulation. For my decking I used recycled Jarrah.'

Save money	Healthy & comfortable	Enviro-friendly	Tips
✓	✓	✓	**Choose a high WERS (window energy rating scheme) rating.** A 5-star rating indicates the best performance. Focus first on the rooms you use the most, and the rooms your home assessment identified as uncomfortable. Depending on your climate, you may choose to focus more on heating stars or on cooling stars. In most climates it pays to focus on both!
✓	✓	✓	**Enable natural ventilation.**
		✓	**Use environmentally friendly timber.** Look for timber from certified sustainably managed forests.
✓	✓	✓	**Use insulation with a high R value.** See the *Your Home* insulation factsheet for more information on insulation R values and which insulation types work best in what parts of your home.
		✓	**Use environmentally friendly insulation.** Look for insulation that has a large proportion of recycled content, or uses natural materials like cellulose, or both.

Checklist for choosing building products

Number of WERS stars:

	heating stars	*cooling stars*
Windows:		
Glass doors:		
Skylights:		

Skylights have in-built shading . . . . . ☐

Openable windows . . . . . ☐

Operable skylights . . . . . ☐

If using timber window frames:

Certified timber (e.g. FSC) . . . . . ☐

Plantation timber (e.g. treated pine) . . . . . ☐

Decking will be:

Recycled timber . . . . . ☐

Certified timber (e.g. FSC) . . . . . ☐

Plantation timber . . . . . ☐

Composite . . . . . ☐

Insulation details:

	insulation type	*R value*
Roof/ceiling:		
Walls:		
Floor *(if required):*		

Details:

FSC certification

Loss of biodiversity (the variety of plants and animals) has been identified as one of Australia's biggest environmental problems. Rainforests and old growth forests provide important habitat for native animals. The Forest Stewardship Council (FSC) timber certification scheme is recognised by many environment groups as the most rigorous certification standard for responsible forest management. FSC-certified timber is available in Australia.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.wers.net – Window and skylight energy ratings

www.ecospecifier.org – Sustainable building products guide

www.geca.org.au – Good Environmental Choice products

Choosing interior products

Kitchen cabinets and benchtops

It may be possible to save money by re-finishing old cabinets to give them a new look, or perhaps just replacing the doors and benchtops, and leaving the rest as is. If you are choosing laminated or timber veneer cabinets, ask for low VOC products—E1 standard (good) or E0 standard (best). There are many good plantation or FSC-certified veneers available. Some companies even supply kitchens made from recycled timber.

If you already have a marble or granite benchtop, can you save money by reusing it? These benchtops are popular and durable but can be expensive. Other options are reconstituted stone, and low VOC laminates and acrylics.

Floors

Tiled floors and polished slabs are durable and easy to clean. If you have a concrete ground slab, tiling or polishing it is the best way to utilise its 'thermal mass' to stabilise indoor temperatures. For safety, consider slip-resistant tiles, especially for bathrooms and kitchens.

'We didn't know that building products can affect healthy air indoors. One of our kids has asthma, so we're definitely going to find out more.'

Polished slabs are likely to require more labour and cost more than tiles, but you can get different decorative finishes that look great. *[See Your Home: Passive solar heating; Passive Solar cooling; Thermal mass.]*

Timber floors add a sense of warmth to a room and are easy to clean but must be well sealed against air leaks and insulated in cold areas. Choose timber that's from certified sustainably managed forests, such as FSC-certified timber, or you may want to consider recycled timber. Bamboo is another environmentally friendly and highly durable option. Many timber floor varnishes and sealants give off low-level toxic fumes, so ask for low VOC products or, better still, natural products such as tung oil or beeswax.

Resilient surfaces like rubber and cork are also durable and easy to clean. Many resilient floor finishes use natural or recycled ingredients. Other all-natural options include sisal or coir. Carpet adds a cosy feel but may not be the best choice for those with allergies or asthma unless vacuumed regularly with the right equipment.

Paints

Regular paints give off low-level toxic fumes that can cause breathing irritations and headaches. Painted surfaces can continue 'off gassing' for months after painting. Many companies now offer low VOC products for the same cost. Good ventilation and indoor plants can help reduce the effect of paint fumes. If you want an even healthier and greener option, choose paints that contain all-natural ingredients. These cost a bit extra but may be worth it if you have allergies or young children.

[See Your Home: Biodiversity off-site; The healthy home.]

Carpentry and furniture

If you're using MDF, ply or particleboard for kitchen cabinets, cupboards and built-in shelves, healthier low VOC options are available. Look for E1 or, even better, E0 rated products. Use low VOC paints and varnishes to finish them. Low VOC adhesives are also available.

Healthy paint tips

Adding colour pigments to a low VOC, light coloured paint base usually increases the emissions—check with your supplier. A cost effective strategy is to use natural paints for darker feature walls and light-coloured low VOC paints elsewhere in the home.


Style Plantation

Durable flooring that looks great

'We wanted our flooring to be durable, easy to clean ... and most importantly to look great! After going through the options, we chose a polished slab for the ground level and bamboo flooring upstairs.'

Save money | Healthy & comfortable | Enviro-friendly

Tips

✓ ✓ **What can you reuse?** Making the most of what you already have saves money *and* the environment. It's worth discussing this with your designer or kitchen supplier.

✓ ✓ **Use natural or low VOC products.** Reconstituted timber includes plywood, medium density fibreboard (MDF) and particleboard. It's the glues and solvents used in them that contain VOCs.

✓ **Use timber from certified sustainably managed forests.**

✓ ✓ **Consider other environmentally friendly products.** You can search the ecospecifier website by product category, for example by choosing 'kitchens', 'flooring', 'paints' etc.

Checklist for interior products

Reuse kitchen benchtops . . . . . ☐
Reuse cabinet 'carcass' (the insides) . . . . . ☐
Other:

Kitchen cabinets:
- Solid timber . . . . . ☐
- Low VOC reconstituted timber . . . . . ☐

Floor sealant:
- Natural product . . . . . ☐
- Low VOC product . . . . . ☐

Paints:
- Natural organic paints . . . . . ☐
- Low VOC paints . . . . . ☐

Kitchen cabinets:
- Recycled . . . . . ☐
- Certified (e.g. FSC) . . . . . ☐
- Plantation . . . . . ☐

Timber floors:
- Recycled . . . . . ☐
- Certified (e.g. FSC) . . . . . ☐
- Plantation . . . . . ☐
- Bamboo . . . . . ☐

Environmentally friendly products we're considering:

Make a good choice

Look for the internationally recognised Good Environmental Choice label on building products. It's a guarantee that the product meets high environmental performance standards.

Useful websites

www.yourhome.gov.au – Guide to good home design

www.ecospecifier.org – Sustainable building products guide

www.geca.org.au – Good Environmental Choice products

Choosing appliances & lighting

Major appliances

Appliances typically use about 25% of your household energy and produce about 45% of your greenhouse gas emissions.

If you're buying new white goods, they have an energy star label, and washing machines and dishwashers also have a water star label, to make choosing efficient models easier. Each extra star will save you 15 to 30% in running costs.

However, when choosing appliances it's not just the stars that count. It's also important to buy the right size. For example, a 550-litre 5-star fridge could actually use more energy than a 350-litre 4-star one. A washing machine that is too large will mean you end up doing part-full loads. So think about the size and features you really need. Then choose a product with the highest star rating you can afford. There is often no connection between star rating and price.

Cook tops and ovens do not have energy labels. Gas generally has significantly lower greenhouse emissions than electricity, but ensure you have a good range hood to get rid of combustion gases. *[See Your Home: Appliances.]*

'We tried fluorescent lighting years ago and didn't like it, but these new "warm white" globes are just fine!'

Lighting

Avoid having to use artificial lighting during the day. Use energy efficient windows and skylights to optimise the use of natural daylight indoors. You don't need big skylights to provide enough natural light. See pp 20–21.

The Australian Government is phasing out inefficient incandescent lamps by 2010. Energy efficient compact fluorescent lamps (CFLs) come in a wide range of shapes, sizes and colours, and dimmable models are now available. CFLs can replace just about any incandescent bulb in your home, including halogen downlights.

Renovating is a good time to get your lighting right. Many people just choose low voltage halogen downlights, but these are very inefficient. A 50 W halogen downlight can use 65 W including the transformer, more than a standard 60 W bulb. CFL and LED downlights use much less energy and also last about 6 to 10 times as long—a great advantage for bulbs in hard to reach places. LEDs vary in efficiency so look for models that produce at least 40 lumens per watt—ask the retailer. LEDs are more expensive, but are getting cheaper and better all the time.

If you don't replace halogen downlights, try swapping 50 W bulbs for 35 W or even 20 W. Many people use 50 W bulbs and then dim them as they are too bright, which is much less efficient than using the right bulb.

It's best to minimise the number of downlights if possible, even energy efficient ones, as they are a wasteful way to light a room. *[See Your Home: Lighting.]*

Star rating labels

Energy efficiency star rating labels can be found on fridges, freezers, dishwashers, washing machines, clothes dryers and air conditioners. Washing machines and dish washers also have a water efficiency label. The more stars the more efficient the appliance. The star rating of any appliance on the market can be found at www.energyrating.gov.au and www.waterrating.gov.au.

These options provide similar light levels:	Standard bulbs		Downlights		
	1 x 15 W CFL	1 X 75 W incandesc.	5 x 11 W CFL	4 x 35 W IRC halogen	4 x 50 W halogen
Lifetime hours	10,000	1,000	15,000	5,000	2,500
Purchase cost*	$10	$1	$100	$60	$40
Running cost*	$33	$164	$120	$350	$569
Total cost*	**$53**	**$179**	**$220**	**$490**	**$669**
Greenhouse gas emissions*	219 kg	1,095 kg	803 kg	2,336 kg	3,796 kg

**** Over 10 years. Based on usage of 4 hours a day. Purchase cost includes lamp cost and transformer for halogens. Operational costs and greenhouse gas emissions will vary with hours of usage, electricity rates and location. One standard bulb is compared with the minimum number of downlights required to light the average room.***

Tackling the big energy users

'We didn't realise that the fridge was the biggest energy user of all appliances! So we searched online for energy saving fridges in the size range we needed, and chose a 4-star model. We're also going to turn off the old fridge in the garage, and use it only when we really need it.'

Save money	Healthy & comfortable	Enviro-friendly	Tips	Checklist for appliances and lighting
				Is the current fridge too large or too small? Do we wash part loads in our washing machine or dishwasher?
✓		✓	**Buy the right-sized appliances.** Over-sized appliances use more energy and water than is necessary.	
✓		✓	**Reach for the stars**. Buy appliances with the highest star rating available in the size you need (check at www.energyrating.gov.au and www.waterrating.gov.au).	Star ratings / *energy stars* / *water stars* Fridge Dishwasher Washing machine Clothes dryer
✓		✓	**Keep your fridge cool.** To work most efficiently, fridges and freezers need at least 50 mm for air circulation all around. Also make sure the fridge isn't too close to the oven, next to a hot external wall or in direct sunlight.	Adequate clearance around fridge . . . . . ☐ Fridge away from oven and other heat sources . . . . . ☐
✓		✓	**Choose fluorescent lighting.** The exceptions are places where lights are on for only very short periods, such as separate toilets or stairs, where instant lighting is needed. You could use 20 W halogens or LEDs here.	All light fittings are suitable for CFLs (compact fluorescents) . . . . . ☐
✓	✓	✓	**Avoid recessed downlights.** These allow a lot of heat to escape through your ceiling. Other options include ceiling or wall-mounted fittings and track lights.	Downlights have been avoided . . . . . ☐ or Only a few downlights have been used . . . . . ☐
✓		✓	**Use multiple and two-way light switches**. Use separate switches for different lights or small groups of lights, perhaps no more than three, instead of one switch for all the lights in a room. If a room has two entrances, use two-way switching so it's easy to turn lights off when leaving the room.	Separate switching . . . . . ☐ Places to install two-way switching:
✓		✓	**Use motion sensors on outdoor lights.** Set the 'on' time as short as is practical.	Sensors with adjustable time setting . . . . . ☐
✓	✓	✓	**Use 'task' lights.** Use efficient table or floor lamps for specific tasks, instead of lighting the whole room to a high level.	Power points installed for task lights . . . . . ☐

Are you wasting electricity?

When was the last time you used the clock on your microwave? Lots of products consume standby energy even when we aren't actually using them, especially things turned off with a remote control. About 10% of household electricity use is standby. If there's no OFF button, turn appliances off at the power point. Using power boards can make this easier. Look for products that can be turned off or have the ENERGY STAR low standby label.

Useful websites

www.yourhome.gov.au – Good home design

www.energyrating.gov.au – Appliance energy star ratings

www.waterrating.gov.au – Appliance water star ratings

www.environment.gov.au – Phase out of incandescent lights

www.energystar.gov.au – Energy efficient home electronics

Choosing heating, cooling & PVs

Heating and cooling

First follow the ideas on pp 8–11 to make your home as comfortable as possible by working with the climate. This way you can minimise or avoid the need for artificial heating and cooling. If you need heating and cooling it's best if you can close off different parts of the house.

If you need heating, avoid electric heaters such as bar, fan and oil-filled models if possible—they are expensive to run and result in a lot of greenhouse gas emissions. However, they can be useful for small well-insulated spaces if you only need occasional heating.

An efficient natural gas space heater is usually the best heating choice. If you don't have gas, an efficient reverse-cycle air conditioner is also a good option. Gas heaters and air conditioners and have energy star labels to help you choose the most efficient model. Unflued gas heaters have a high star rating, but need quite a lot of ventilation to get rid of the combustion fumes. This reduces their overall efficiency. A high efficiency flued unit may be a better solution. Unflued heaters are not allowed in some parts of Australia.

If you need cooling, think about installing ceiling or wall fans. These can often provide a good level of comfort while using very little energy, especially in humid areas where air movement is more important.

'GreenPower lets us go 100% green for about the cost of a cup of coffee a week.'

Ceiling fans can also be used in winter, to push warm air trapped at the ceiling back to floor level. The operating speed must be low to avoid creating a draught. If fans aren't enough, consider an evaporative cooling system. These work well in less humid areas and use about 75% less energy than a conventional air conditioner. Water use may be an issue in water-restricted areas.

If you need an air conditioner, buy one with a high star rating for cooling. Split systems and inverter models are generally more efficient and quieter. Ducted heating and cooling systems should allow you to heat or cool only the rooms you need. Ensure the roof ductwork is well-insulated, to at least R1 for heaters and R1.5 for coolers.

[See Your Home: Heating and cooling.]

Photovoltaics

Photovoltaics (PVs) or solar cells use the sun's energy to generate clean, green electricity. A PV system will reduce the amount of electricity you draw from the grid. When it's producing more electricity than you need, the excess is fed back into the grid—and you are credited with providing that energy. Some states pay you more for the energy you supply than for the energy you use. The important thing is to reduce the amount you use in order to maximise the amount you can sell back. To design and install your system you'll need expert advice. Contact the Business Council for Sustainable Energy to find an accredited designer/installer. PVs are expensive, but large government rebates are available to offset the cost. Only systems installed by accredited practitioners are eligible for rebates.

[See Your Home: Renewable energy; Photovoltaic systems.]

Evaporative coolers & water use

Evaporative coolers can use a lot of water on a hot dry day, so if you are in a water-restricted area think about using rainwater or another reclaimed water supply. Some models are more water efficient than others, so check before you buy. Make sure the bleed-off rate is set to the minimum.

GreenPower

If you can't afford a PV system, ask your electricity supplier about purchasing accredited GreenPower—look for the logo. It costs slightly more than standard electricity generated from burning coal, but is an economical way to ensure you are using electricity from an accredited renewable source. Choose 100% GreenPower if you can afford it.

Harnessing the sun's free energy

This grid-connected photovoltaic array provides its owners with 1,560 KWh a year, about a quarter of their total electricity use. The array is installed on the north-facing roof, which is pitched at about 30 degrees to maximise PV efficiency in winter.

For more information see the Sunbury Victoria case study at www.yourhome.gov.au.

Save money	Healthy & comfortable	Enviro-friendly	**Tips**	**Checklist** for heating, cooling and PVs
✓	✓	✓	**Minimise the need for artificial heating and cooling.** Follow all the good design tips on pp 8–11.	How we'll cut back the need for heating and cooling:
✓	✓	✓	**'Zone' your house.** Be able to close off unoccupied parts of your house that may not need to be heated or cooled.	Rooms or areas that could be closed off:
✓	✓	✓	**Choose efficient heating and cooling systems.** Follow the tips on the facing page. If you have central heating or cooling, make sure it allows you to only heat and cool the rooms you need.	System or systems we'll use: Star rating (if applicable):
✓	✓	✓	**Size heating and cooling systems properly**. This ensures best results. Ask your supplier, or use the calculators on the Choice or Fair Air websites below.	Correct size for our needs:
✓	✓	✓	**Maintain heating and cooling systems.** Keep your heating and cooling system properly maintained for optimum efficiency.	Arrange annual maintenance program . . . . . ☐ Maintenance month will be:
✓		✓	**Minimise electricity use.** This is the first step before installing PVs, so you can maximise the percentage of your electricity use supplied by the PV system. See if you can avoid big electricity consumers such as electric space heaters, clothes dryers and very large plasma TV screens.	Appliances with a high star rating: Efficient solar, gas or heat pump HWS . . . . . ☐ Efficient lighting . . . . . ☐ Other electricity-saving strategies:
✓		✓	**Make sure you have adequate roof area for PVs and solar hot water.** PV arrays need to face the sun for optimum efficiency. Fixed panels usually face north. (See the diagram in the *Your Home* Photovoltaic systems factsheet.) Make sure there is adequate unshaded roof area—about 10 m^2 per 1,000 W.	North-facing roof area available (m^2): Other suitable roof area, if north not available:

Tips to save energy

Don't leave the heating or cooling running on low overnight or while you're out. Dress for the weather instead of turning the thermostat up or down—each degree higher in winter or lower in summer will increase energy use by about 10%.
Close curtains when using heating.

Useful websites

www.greenpower.gov.au – Accredited GreenPower
www.greenelectricitywatch.org.au – Compare GreenPower products
www.bcse.org.au – Business Council for Sustainable Energy
www.cleanenergycouncil.org.au – Renewable energy industry body
www.greenhouse.gov.au – Renewable energy information
www.fairair.com.au – Air conditioning industry body
www.choice.com.au – Calculators for heating and cooling



Choosing plumbing products

Bathroom products

The most important thing is to choose products with a high star rating. Focus especially on the shower and toilet, as these, along with the washing machine, are the top water users inside a home.

Good choices	Litres saved each year*
3-star shower	up to 12,000 litres
4-star toilet	15,000 litres

** compared to the average use in homes*

You can now get a 5-star toilet which has a basin over the cistern. When you wash your hands, the water fills the cistern and is reused for flushing the toilet. It not only saves water, but is a great space-saver too. If you want to save even more water, consider a waterless toilet. *[See Your Home: Reducing water demand; Low impact toilets.]*

Plumbing

Environmentally friendly plumbing options, such as polyethylene pipes, are now available. See ecospecifier for more information. Hot water pipes, including plastic pipes, should be insulated ('lagging').

Hot water systems

Water heating is responsible for more than a quarter of the average home's energy bills and greenhouse gas emissions. An electric storage system can be responsible for up to half of a home's greenhouse gas emissions.

'Our new solar water heater has slashed our energy bills.'

Installing an efficient 'low greenhouse' hot water system can significantly reduce emissions and add value to your home. Step 1 is to use less hot water by installing water efficient showerheads, taps and appliances. Shorter and smaller diameter pipes can also cut down on wasted energy and water. If you can't locate your system close to where the hot water is used, install a device to recirculate on-demand the water that's gone cold in the pipes.

Gas-boosted solar systems generally have the lowest greenhouse emissions, and standard electric storage the highest. High efficiency (5+ star) gas storage and instantaneous units, heat pumps and electric solar have very similar emissions, but this varies slightly depending on where you live. The best choice of system depends on several things:

- whether you have gas
- whether you have good sunshine for a solar system
- how much hot water you use
- how much space you have, and, of course, the budget.

Solar and heat pumps are usually a bit more expensive but rebates are available to bring down the cost.

Use the chart below to help you decide which systems to consider. It takes the initial cost into account as well as running cost. It is for general guidance only. You should seek expert advice to make the best decision. If you are primarily interested in minimising greenhouse emissions, choose a heat pump or electric-boosted solar run on 100% renewable electricity, such as GreenPower, or gas-boosted solar. *[See Your Home: Hot water service.]*

Become a convert

It may be possible to retrofit a solar booster panel to your instantaneous or storage hot water system. If your current system is not very old it may be worth exploring. However, check your eligibility for rebates.

Which hot water system should I buy?	1–2 people		3 people		4 people		5+ people	
	Gas	No gas	Gas	No gas	Gas	No gas	Gas	No gas
Gas 5-star storage					✓		✓	
Gas 5-star instantaneous	✓		✓		✓			
Heat pump		✓*		✓*	✓	✓	✓	✓
Solar electric ^		✓		✓		✓		✓
Solar gas ^			✓		✓		✓	

^ If you have good sunshine on your roof
* Especially if you don't have good sunshine on your roof

Renewable Energy Certificates (RECs)

You may be eligible for RECs and other rebates to reduce the initial cost of replacing electric storage systems with 'low greenhouse' water heaters. Check with your local council, your state sustainable energy agency, the Australian Government Department of the Environment, Water, Heritage and the Arts, or your hot water system supplier.

Save money	Healthy & comfortable	Enviro-friendly	Tips	Checklist for plumbing products
✓		✓	**Reduce water use.** Focus especially on the shower and toilet. As far as hot water goes, showers use around 60–70% of hot water in most homes, and clothes and dishwashers use a lot of the rest.	3-star showerhead ☐ 4-star toilet ☐ 5-star toilet (integrated basin) ☐ Waterless toilet ☐ Appliance star ratings:
		✓	**Consider environmentally friendly plumbing.** See ecospecifier for products: www.ecospecifier.org.	Polyethylene pipes ☐ Other environmentally friendly options:
✓		✓	**Locate HWS close to hot water taps.** A lot of hot water is wasted in long pipes. It's best to group hot water taps close together and locate the HWS nearby.	HWS near the most frequently used tap ☐ Or, if this isn't possible: Hot water on-demand recirculator installed ☐
✓		✓	**Insulate hot water pipes.** All hot water pipes should be insulated to at least R1—check with your plumber. The green pipe cover many plumbers use is not adequate.	Hot water pipes insulated ☐
✓		✓	**Check you have enough access to sun.** Solar hot water systems need a north-facing roof space unshaded between about 9 am and 3 pm for proper operation.	Adequate north-facing roof space ☐
			Check your roof can support an all-in-one system. All-in-one rooftop solar water heaters weigh up to 500 kg when full of water. If your roof isn't strong enough you could install a split system (i.e. where the tank is separate from the roof panels).	Does the roof structure need to be strengthened?
✓		✓	**Go for the highest efficiency rating.** Gas water heaters have a star rating label, so if choosing gas go for the highest rating. Solar and heat pumps are eligible for Renewable Energy Certificates (RECs)—choose one with the highest number of RECs.	Star rating if gas used: RECs available for solar or heat pump HWS:
			Allow adequate space for a storage tank. If you decide on a storage HWS allow adequate space for the tank. These can be quite large. Heat pumps also need good air circulation to work properly.	Suitable locations for the storage tank:

Instantaneous or storage?

Small households with low hot water use (3-star shower and cold water clothes washing) are usually better off with an instantaneous system as there are no storage losses from hot water in the tank. They're also good for holiday homes. Gas water heaters have a star rating label—always go for the highest number of stars.

Useful websites

www.yourhome.gov.au – Good home design

www.ecospecifier.org – Sustainable building products guide

www.greenhouse.gov.au – Renewable energy information

www.orer.gov.au – Renewable energy certificates (rebates)

Choosing rainwater & wastewater products

Collecting and using rainwater

For many renovations, installing a rainwater tank will be a requirement. In any case, it can be a great way to save even more water, once you already have a water efficient house and garden. In most areas rebates are available on the cost of rainwater systems (unless they're already required by law).

To get the most out of your system, firstly make sure you have a decent roof area from which you can collect water. You can maximise the area by using underground tanks, or above ground tanks that use a 'wet downpipe' system. Secondly, make sure you have a decent tank capacity—3,000 litres or more is recommended if you have room. You may have to install a minimum-sized tank to qualify for rebates. If space is tight, many innovative solutions are available, such as under-floor bladders and interconnecting plastic tanks that double as fences. Lastly, make sure you're connected to at least one indoor use like toilet flushing or the washing machine.

If you're collecting rainwater from a new roof, choose a compatible roof material (steel is ideal, most tiles are also fine).

'These systems do need regular maintenance, but it's no big deal when you get used to it.'

If you're collecting from an old roof and will use the rainwater for drinking, your builder will need to check for lead flashing and seal it. You may also need special gutter treatments such as screens to keep out debris. Not all states allow rainwater to be used for drinking water. *[See Your Home: Rainwater.]*

Recycling wastewater

Domestic greywater systems collect and treat wastewater from the shower and laundry for reuse in the garden or within the home for toilets or washing machines. Arrange drainage pipes so it will be easy to collect greywater at one point. Regulations vary so check first with your local council, and then make sure you seek expert advice on choosing and maintaining your system. In many areas rebates are available.

Be aware that greywater systems do require a reasonable level of homeowner commitment to maintenance, to avoid health risks and soil damage. If you're using untreated greywater on the garden you'll need to check with your expert that your soil and plants can handle it. You'll also need to use detergents and powders that contain no phosphate or salt.

A licensed plumber must be used when installing rainwater and greywater systems, in addition to any plumbing work within the renovations. Many plumbers will be able to provide specialist advice regarding rainwater collection and usage. *[See Your Home: Wastewater reuse.]*

What's wastewater?

Wastewater is the general term for contaminated water. 'Greywater' is used to describe water from the shower and laundry. 'Blackwater' is water that includes sewage from the toilet. Check regulations—in some areas the reuse of treated blackwater may be prohibited for single dwellings. The shower and laundry are the best sources of wastewater, requiring less treatment than water from the kitchen or toilet. The level of treatment needed also depends on what you plan to use it for.

Rainwater tank maintenance tips

Maintain your rainwater system regularly to keep it operating well. Check roofs and gutters for debris, and keep your roof clear of overhanging trees. Check and clean mosquito screens and first flush diverters. Drain and clean out your tank every few years to remove sediment.

Plumbing that's future proof

We couldn't afford a greywater system upfront, but our plumber had a great 'future proofing' idea. He installed the extra plumbing while he was doing the regular work. It didn't cost much and now we—or any future buyer—can add greywater more easily later.

Save money	Healthy & comfortable	Enviro-friendly	Tips	Checklist for rainwater and wastewater
			Check regulations before you start. Check with your local council or state health department about the regulations on using rainwater and greywater. Your plumber may also be able to help.	Rainwater regulations: Greywater regulations: Other applicable regulations:
✓			**Check if rebates are available.** Make a note of rebate amounts and any conditions that apply.	*Item:* / *Rebate available:* Rainwater system: $ Greywater system: $ Other: $ **Total (for water systems): $** Conditions:
✓		✓	**Get the most out of your rainwater system.** Maximise the roof area you will collect water from and install an adequate size tank. For maximum benefit connect the sytem to the toilet or laundry. You may have to install a minimum-sized tank and indoor connection to qualify for rebates.	Maximise roof area you collect from . . . . . ☐ Tank capacity of at least 3,000 litres . . . . . ☐ Connect to toilet and/or laundry . . . . . ☐
	✓		**Check your roofing.** Ensure it's compatible for drinking water collection, if that's what you plan and are allowed to do.	Steel or terracotta tiles . . . . . ☐ Any lead flashing properly sealed . . . . . ☐
	✓	✓	**Seek expert advice on wastewater reuse** (greywater or blackwater systems). Make sure you're aware of the maintenance procedures required and how often they need to be done.	People we'll talk to for expert advice: Applicable systems: Maintenance requirements:

Find out about rebates

You may be eligible for a rebate on the cost of your rainwater or wastewater system. Check with your local council, state government or water utility.

Useful websites

See your local water provider's website.

www.ecospecifier.org – Sustainable building products guide

www.greenplumbers.com.au – Accredited plumbers

www.enviroplumber.com.au – Accredited plumbers

www.arid.asn.au – Industry body for rainwater and wastewater

Living in your new home

But wait, there's more!

Now that you have a stylish, cost effective and environmentally friendly renovation, what more can you do to save money—and the planet? The little things we do as part of our everyday lives can have as big an impact on the environment as our homes, and sometimes much bigger! This is particularly true for transport, especially flying, and what we eat. In the past few years, the environment has become a much higher priority for the average Australian. Now that you've taken the steps to renovate your home, this last page includes some tips for living in it which will help you to further reduce your impact on the environment.

Around the house

- Take shorter showers—use a shower timer.
- Wash clothes in cold water whenever possible.
- Turn off appliances at the power switch.
- Set thermostats lower in winter and higher in summer—each degree saves about 10% in energy.
- Fully load washing machines and dish washers.
- Dry your clothes on a line, not in a dryer.
- Turn off your hot water system when you go away.
- Switch off lights when you leave the room, even for for a few minutes.
- Recycle cardboard, paper, glass, plastic and cans.
- Compost food and garden waste at home or through your local council.
- Buy accredited GreenPower.

In the garden

- Use local native plants that don't need much water.
- Minimise use of pesticides.
- Use water wisely—use drip irrigation systems and mulching. Water when it's cool.
- Cover your swimming pool.

Food

- Grow your own vegetables.
- Avoid products that have been transported long distances, especially by air.
- Consider organic food.

Shopping

- Refuse unnecessary packaging.
- Take your own shopping bags.
- Avoid buying things you don't really need.
- Share things you don't use often, like a lawnmower, with your friends or neighbours.
- Buy recycled and recyclable products.
- Buy good quality products with a long life.

Transport

- Walk, cycle or use public transport instead of your car.
- Buy a fuel efficient car that's no bigger than you need.
- Join a car sharing or car pooling scheme.
- Take more holidays close to home—avoid flying long distances.

Eat for a healthier planet

Food production and transport uses a lot of energy and water. Generally, vegetables and cereal crops have the lowest environmental impact, and if you buy local and organic you can further decrease your impact. For more tips see the Australian Conservation Foundation Green Home website.

Did you know?

Avoiding one return flight from Australia to London would be equivalent to the greenhouse gas reduction of not driving an average car for two years. If you have to fly, consider offsetting your carbon emissions. Look for a company that funds new renewable energy generation projects.

Useful websites

www.acfonline.org.au – ACF Green Home tips

www.livingthing.net.au – Green lifestyle tips

For copies of this Renovator's Guide, the Briefing templates and Your Home Technical Manual visit www.yourhome.gov.au

Published by Centre for Design at RMIT University and Institute for Sustainable Futures at UTS.
Centre for Design: Building 15, Level 3, 124 La Trobe Street Melbourne
GPO Box 2476V, Melbourne VIC 3001 Australia; www.cfd.rmit.edu.au
Institute for Sustainable Futures: Level 11, Building 10, 235 Jones Street Ultimo
PO Box 123, Broadway NSW 2007 Australia; www.isf.uts.edu.au

ISBN 978-0-646-48814-1

Disclaimer

This document has been prepared as a guide only and is unlikely to contain all the information that renovators may expect or require in order to make informed decisions on their home improvement. The data is to the best of the author's knowledge and is accurate at the date of publication but may vary from time to time with location. Renovators should therefore rely on their own enquiries and obtain appropriate expert advice as part of their decision-making process. The information contain within is provided for information purposes only, this guide should not be relied upon as authoritative advice, where necessary please seek independent legal or expert advice in all matters relating to information contained within this guide.

Acknowledgements

The following organisations collaborated on the production of this Guide: The Australian Government Department of the Environment, Water, Heritage and the Arts; The Building Commission, Victoria; Sustainability Victoria; Department of Environment and Climate Change NSW; Queensland Government Environmental Protection Agency; Department of Housing and Works, Government of Western Australia; Australian Capital Territory Planning and Land Authority; Moreland Energy Foundation; More Communication Design; Centre for Design at RMIT University; Institute for Sustainable Futures at UTS.

Printed on recycled paper using vegetable-based inks.

More information online:
www.yourhome.gov.au

Australian Government
Department of the Environment,
Water, Heritage and the Arts
www.environment.gov.au

The Building Commission
www.buildingcommission.com.au

Sustainability Victoria
www.sustainability.vic.gov.au

Department of Environment
and Climate Change NSW
www.environment.nsw.gov.au
www.livingthing.net.au

Queensland Government
Environmental Protection Agency
www.epa.qld.gov.au
www.climatesmart.qld.gov.au

ACT Planning and Land Authority
www.actpla.act.gov.au

Department of Housing and
Works, Western Australia
www.dhw.wa.gov.au

Moreland Energy Foundation
www.mefl.com.au

Institute for Sustainable Futures,
University of Technology Sydney
www.isf.uts.edu.au

Centre for Design,
RMIT University
www.cfd.rmit.edu.au

Australian Government

Department of the Environment, Water, Heritage and the Arts