



Simple lifestyle changes
to reduce your energy consumption

Energy-Saving Tips FOR **DUMMIES®**



Michael Grosvenor

Author of Sustainable Living For Dummies

A Reference for the Rest of Us!®



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Energy Saving-Tips For Dummies®

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Energy-Saving Tips For Dummies

by Michael Grosvenor



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About the Author

Michael Grosvenor is a leading urban planning professional and freelance writer on sustainability. Through his work and writing, Michael promotes the benefits of making sustainable lifestyle choices. Michael has particular expertise in transport and advises the private sector and government on policies that promote increased public transport, walking and cycling facilities. Michael is a strong advocate for the important role that public transport plays in our cities and towns. He is the author of *Sustainable Living For Dummies* and *Water-Saving Tips For Dummies*.

Michael is the director of his own consultancy and holds Masters degrees in Urban Affairs and Applied Social Research and a Degree in Town Planning. He is also a member of the Planning Institute of Australia and provides advice to the Institute on integrated land use and transport planning issues.

Michael has lived and studied in New York City, but currently enjoys an inner-city lifestyle in Sydney, Australia.

Dedication

To my best friend and partner, Justine — thank you for your encouragement and support.

Author's Acknowledgments

My desire to talk to the general public about sustainable living motivated me to write this book. I'm often preaching to the converted in my consulting work. The environmentalists, planners, architects, social scientists, engineers and geographers I work with and I find ourselves saying the same things to each other, and we're often scribbling messages and ideas on whiteboards that no-one else gets to see.

Writing a book for an audience interested in adopting energy-saving tips in the home has been very rewarding. This book covers a lot of useful information about energy efficiency — perhaps too much ground for one person to have the required expertise on every topic. I have been able to carry out the necessary research for this book thanks to the thousands of committed professionals out there who have tested, researched and published their findings about the problems facing the planet. This book could not have been written without their passion.

I thoroughly enjoyed working with editors Robi van Nooten and Maryanne Phillips and thank them both for excellent editorial contributions and ideas.

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Introduction

People's insatiable demand for traditional forms of energy such as coal and oil now outweigh the planet's ability to supply them. As well, burning and refining these fossil fuels for electrical energy and transport emits so many damaging greenhouse-forming gases that it is considered a major contributor to global warming. The warmer planet you live on now faces some serious environmental problems — rising sea levels, unnatural weather patterns and changing ecosystems. By adopting some simple lifestyle choices and habits that include using energy more efficiently, you can help to get the planet's balance back on an even keel.

More than likely you picked up this book because you know the planet is in trouble and that alternative energy sources that produce little or no greenhouse emissions are now available. *Energy-Saving Tips For Dummies* provides you with practical tips that you need to change your current energy-consumption patterns. This book isn't about changing your whole life by denying a certain lifestyle; instead, it offers practical advice about how to live in a more energy-efficient fashion.

I'm not expecting you to adopt every single one of the actions contained in this book. Far from it. I know from personal experience that doing so is a life-long task. Starting small by adopting any one of the tips in this book is a positive beginning.

Significantly, this book isn't just about the actions you take to become more energy efficient inside the home. After all, reducing your power bill isn't just about saving money. This book may be the beginning of a journey that leads you to make other choices as a consumer about embracing sustainability in general. I am confident that this book can give you a better

understanding of the choices available to you and how making these choices can make a real difference.

How to Use This Book

I'd love you to sit down and read the book from beginning to end. After all, I think it's a great read. But realistically, you're probably likely to dip in and out of it to find the tips you need. That's why *Energy-Saving Tips For Dummies* covers each topic in its own chapter. You can skim the contents and go straight to the chapters that interest you most.

If you're coming to this book as an energy-conservation novice and want a bit of background on the topic, your best bet is to go straight to Chapter 1. You can then move through subsequent chapters (and rooms of the house) to the garden and the workplace at your own speed with a much better feel for why each action is worthwhile.

How This Book Is Organised

Energy-Saving Tips For Dummies is divided into five chapters, each focusing on a different aspect of how to be more energy conscious in your daily life both at home and at work.

Chapter 1: The Energy-Efficient Household

This chapter describes the energy crisis and lays the foundation for how you can reduce the pressure on the planet by reducing energy consumption.

Chapter 2: Energy Efficiency — Room by Room

This chapter contains tips that help lower your energy use in every room of your home by encouraging you to adopt lifestyle changes that make a difference.

Chapter 3: The Energy-Efficient Workplace

Your workplace has potential plus when it comes to making a positive influence on the environment. In this chapter I show you how to encourage your workplace to adopt a ‘greener’ approach to energy use. I also look at how you can set up your home office in an energy-efficient way.

Chapter 4: Wheels, Pedals and Heels: Getting Around

This chapter looks at how you can balance your need for an energy-guzzling car with other more energy-efficient forms of transport such as cycling. I also give you a peek into the future of the ‘green’ car revolution.

Chapter 5: Ten Energy-Saving Tips

This helpful chapter gives you my top-ten tips for becoming energy efficient. And, if your kids read just this chapter, they’re likely to grow up with an energy-wise mindset.

Icons Used in This Book



This icon highlights inside stories about real, live people who have incorporated energy-saving practices into their lifestyle.



This icon flags handy Web sites.



Warning icons are serious stuff. Read carefully and take heed.



Don't forget these little pearls of wisdom. Remember and remember . . .



This icon flags relatively in-depth detail. You may want to skim over these, or undertake further research on the technical area being discussed. Believe me, they can be fascinating.



Tips are the little things you can do to make your energy-wise lifestyle more achievable. These brainwaves offer you handy shortcuts.



'Kids, we promise to do something about global warming when the water level reaches the television.'

Glenn Lumsden

Chapter 1

The Energy-Efficient Household

In This Chapter

- ▶ Understanding the energy crisis
 - ▶ Reducing your heating and cooling bill
 - ▶ Rating energy-efficient appliances
 - ▶ Finding effective lighting solutions
 - ▶ Plugging into solar energy and other renewable power sources
 - ▶ Designing for energy savings
-

Most people agree that humans are polluting and using natural resources faster than the environment is able to regenerate itself. Environmental problems such as global warming are exacerbated by the large amount of greenhouse-forming gases emitted into the atmosphere from burning fossil fuels. And higher temperatures are changing weather patterns so dramatically that they have led to an increased number of natural disasters around the world.

When you limit your consumption of energy and other resources to a level that enables the earth to regenerate itself, you're well on the way to living sustainably.

In this chapter, I talk about the energy crisis and look at how you can reduce the pressure you put on the planet by reducing energy consumption in the home. You don't have to buy or build a brand new 'green' house to become more energy

efficient — you can do plenty to reduce the amount of power you use by paying attention to which of your appliances consume the most electricity. Understanding this approach helps you prioritise your energy budget.

I show you that heating and cooling appliances are among the biggest users of energy in your house, but with insulation and other energy-efficient measures incorporated into the design of your home you can significantly reduce how often you need to use them. Many people are surprised to discover that hot water is also a major energy hog. A solar hot-water service is a great way to reduce your electrical energy consumption in a big way.

Understanding Why the Energy Crisis Is ‘Booming’

Electrical energy powers millions of homes and businesses around the world. Currently, the cheapest and most reliable way of providing electricity to cities and towns is to burn fossil fuels, such as coal, in power plants. Transport also consumes energy produced by refining another fossil fuel — this time, oil. And burning fossil fuels also creates greenhouse-forming gases, such as carbon dioxide, in the atmosphere, which create a blanket that traps heat between it and the earth.

Alternative energy sources that produce little or no greenhouse emissions are now available and, as demand increases, becoming more affordable. As well as switching to alternative sources of energy, some simple lifestyle changes can greatly reduce your energy consumption.

Burning fossil fuels is a major environmental problem, but another aspect to this crisis demands attention. Demand for

fossil fuels has been so high that the planet is running out of them. This imminent depletion may force world leaders to look more seriously at alternative, cleaner sources of energy.

As well as controlling how much energy you consume, you can contribute to the health of the planet by being careful about where you get your energy from. I explain why conventional energy sources are unsustainable and provide you with alternatives that are much kinder on our planet. This includes buying 'green' power or generating your own power. (See the section 'Becoming an Alternative Energy Convert' later in this chapter.)

Holistic Approaches to Heating and Cooling

How do you heat and cool your home? Perhaps you take the edge off the heat in summer by putting on your air-conditioner for a little while. Or maybe you turn on electric heaters in the winter to keep the temperature pleasant in the rooms you use most often.

The appliances you use to heat and cool your home may be costing you more than you realise, though (refer to the section 'Using Energy-Efficient Appliances' to find out how much the average Australian household relies on electrical energy to heat and cool the home). In the following sections, I explain how you can avoid reacting to extremes of temperature with extreme energy usage.

Most artificial heaters and coolers use some sort of electrical energy. Here's a run-down on how they work:

- ✓ **Reverse-cycle air-conditioners:** To lower temperatures, these appliances use coolants that produce greenhouse gases, just like a refrigerator does (to find out more about how refrigerators work, see Chapter 2). However, the newer type of air-conditioners, called inverters, manage electricity more effectively to cool a room, which means they're cheaper to run and produce less greenhouse gas. (Check out Chapter 2 for more information about what to look for when buying an air-conditioner.)



If you already have air-conditioning installed in your home, employ some strategies to minimise how often you use it. For example, try only using the air-conditioner for small amounts of time to lower the temperature in your home, and make sure your home is insulated to maintain the temperature. Needless to say, don't leave the air-con on when you go out, or when doors or windows are open.

- ✓ **Evaporative coolers:** These units don't use coolants that emit damaging greenhouse gases, but they do use more electricity than smaller electric fans and ceiling fans. Also, evaporative coolers don't work well in humid climates because they can't deal with the moisture in the air. Evaporative coolers suit dry climates, like the outback of Australia.
- ✓ **Ceiling fans:** Often overlooked in the rush to buy cold air, ceiling fans are the traditional artefacts of a hot climate lifestyle; they keep the air moving and prevent heat from building up. Overhead fans, combined with properly shaded windows, aren't going to bring the temperature in your home down to 22 degrees Celsius

when the temp in the shade outside is 40 degrees Celsius, but they can create a pleasant and relaxing environment.

- ✓ **Electric radiant heaters:** Most electric heaters only heat the objects in front of them; they're not very good at heating the air in a room.

Better alternatives to electric radiant heaters are fan or convection heaters, which circulate the heat throughout the room. Even better are gas heaters.

- ✓ **Fireplaces that use wood:** The good news is that you don't need electricity to stoke the wood in a fireplace (although some fake fireplaces are powered by electricity). The bad news is that wood fires produce high levels of air pollution because they release gases as the wood burns (just like a bushfire does). They're also an inefficient heating method because much of the heat goes up the chimney (although you can address this by installing a slow-combustion model that redirects the heat from the chimney back into the room).

Insulation is the key

Insulation is a big sustainable, energy-saving deal. A well-insulated home can maintain the inside temperature throughout the day and night. Insulation reduces your need for electrical heating and air-conditioning. If your place is insulated, you only need to use heaters and coolers when temperatures are above or below average for a small amount of time to get the temperature back to a comfortable level.

Even old homes or apartments that weren't designed to be energy efficient can be greatly improved with insulation by keeping the heat out in summer and keeping the warmth in

during winter. And if you're renting your house or apartment, working with the landlord to install insulation may save you money in the medium term by reducing your electricity bill.

Insulation is one of the key design elements to look for when you're buying or building an energy-efficient home or improving your existing home. I discuss the types of insulating material available in more detail in the section 'Insulation' later in this chapter.

Beating the heat

The Australian summer can be a stinker. Sometimes you may wonder how people once survived 40-degree days without the help of air-conditioners and electric fans. Even average outside summer temperatures can make life quite stuffy inside.



Glass windows can let a lot of heat into your home. In fact, covering your windows to protect your rooms from the summer sun is the most effective way of keeping the heat out. Installing awnings and screens and even planting vegetation in the line between the sun and the window work wonders. Here are some other simple things that you can do to ensure that you keep much of the heat generated outside from getting inside.

- ✓ **Verandas, eaves and awnings:** The traditional colonial homestead was surrounded by verandas on all sides. This wasn't just the mark of an outdoors lifestyle; the shade provided by those verandas and the movement of cool air past the external walls of the house kept these homes much cooler in summer. By contrast, large houses on relatively small suburban blocks with small

eaves provide almost no shade, which can turn these houses into 'ovens' on hot days.

If you're building or renovating, ensure that your eaves protect your windows and walls from the summer sun, but allow the low winter sun to stream in through the windows. Alternatively, use awnings or other screens to achieve the same effect.

✓ **Shutters:** From the icy plains of northern Europe to the deserts of northern Africa, shutters traditionally protect homes from the vagaries of the weather. Strangely, they're almost absent from Australian suburban home design these days.

✓ **Curtains and blinds:** Although considered old-fashioned by many people, window coverings have a major role to play in keeping the heat out. Importantly, the *pelmet box* (traditionally used to hide the top of the curtain) traps hot air between the curtain and the window and prevents it circulating into the rest of the room.



If you're building or renovating, one of the most important design factors that makes your home energy efficient is this: Create air flow through the house. Ensure windows are placed in the face of the common cooling breezes, which in an Australian summer usually come from a southerly direction. To take advantage of any breezes that come in, rooms should connect to allow air to flow from one end of the home to the other.

Placing rotating vents, or whirlygigs, in the roof is another very cheap (around \$130 plus installation costs) way to keep a house cool in summer. These devices can reduce the temperature

inside a roof cavity by ten degrees or more, and take the strain off your insulation and internal cooling systems.



Heating with gas

Gas heaters with reverse-cycle heat pumps produce approximately one-third the amount of greenhouse emissions of standard electric heating equivalents. Gas heaters also warm a room very quickly, making them more efficient (and much cheaper to run) than electrical heaters.

Two styles of natural or LPG gas heaters are on the market: Portable heaters and fixed heaters.

With both styles of heaters, you need to ensure that you have enough good air flow to maintain indoor air quality, but not too much to affect the efficiency of the heaters. To overcome some of these problems, you can now get low-combustion heaters, which produce lower emissions and require less air flow.

Staying warm

In Australia, most areas get a lot of exposure in the winter to that great big heater in the sky. As a result, keeping warmth inside the home is a lot easier than cooling it down. Many other countries in the world, especially in the northern hemisphere, rarely get to see the sun during the winter months and don't get much of an opportunity to utilise the sun to offset their heating needs.

The following low-energy techniques take advantage of the sun's ability to heat your home:

- ✓ **Let the sun shine in:** When the temperature starts to drop, lift the shades on those windows that face the sun. The sun can then stream in and heat up the room.
- ✓ **Keep the warmth in:** You've warmed up your room, now you've got to keep it in.
 - Make sure your doors and windows are well sealed so that cold air doesn't get in and the warm air inside doesn't get out.
 - Furnishings like rugs, carpets and curtains are very good at ensuring that the heat stays in a room well into the night instead of escaping through the floor, ceilings and windows.
 - Insulation that keeps the heat out can also keep the heat in. For more information about the types of insulation you can choose from, see the section 'Insulation' later in this chapter.

Using Energy-Efficient Appliances

The household appliances you use, including refrigerators and microwaves, washing machines and entertainment systems, account for about a quarter of household energy consumption in Australia.

The Australian Greenhouse Office points out that the average Australian home uses electrical appliance energy the following ways:

- ✓ **Heating and cooling:** 39 per cent
- ✓ **Water heating:** 27 per cent

- ✓ **General electrical appliances (the TV, dishwasher, washing machine, hairdryer and so on): 12 per cent**
- ✓ **Refrigeration: 9 per cent**
- ✓ **Lighting: 5 per cent**
- ✓ **Cooking: 4 per cent**
- ✓ **Standby energy use (used by electronic equipment like the DVD when shut down by remote control): 4 per cent**

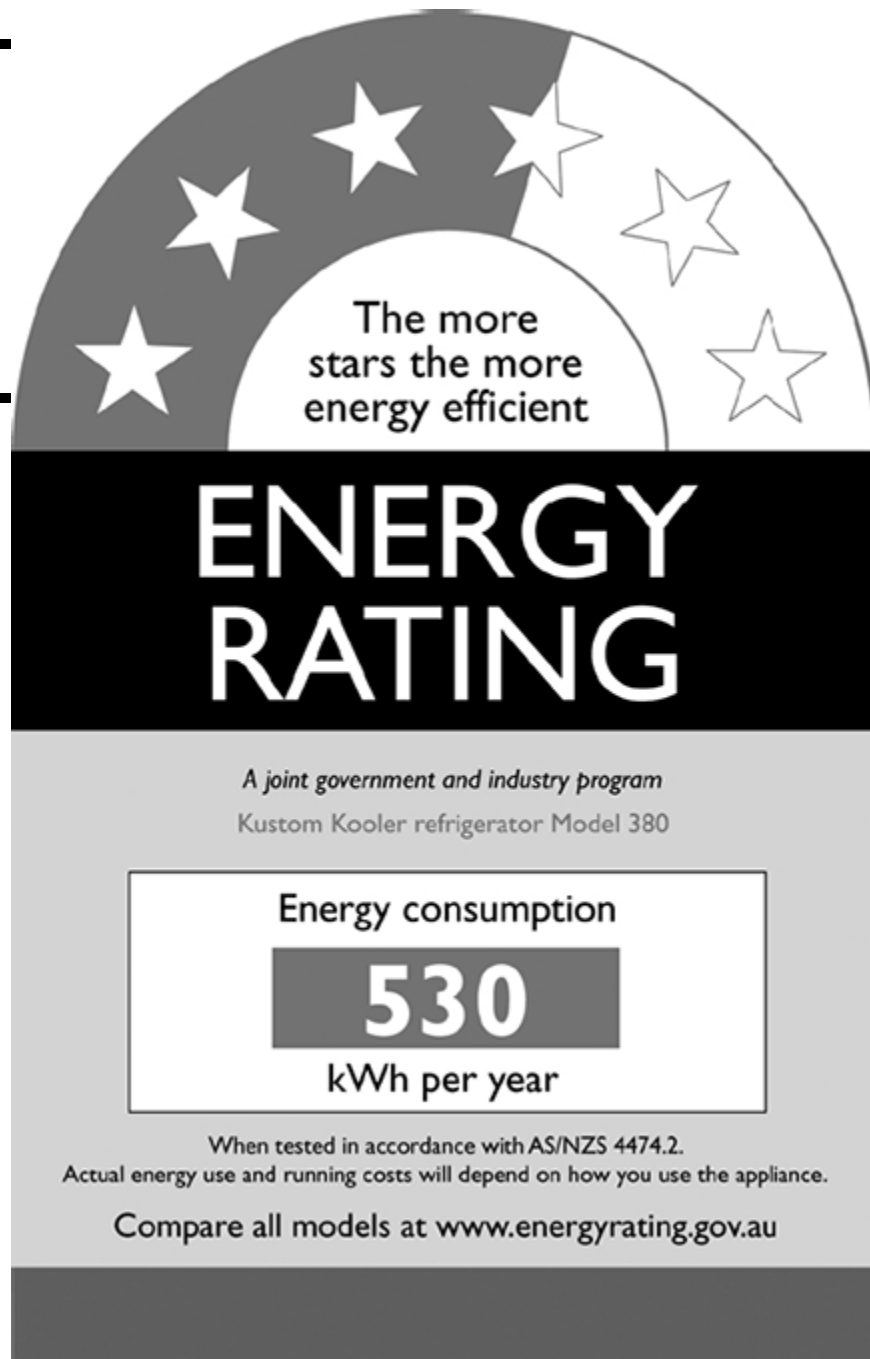
Obviously, reducing your reliance on these appliances is one way to cut your energy consumption. For example, you can hang your clothes on a clothesline instead of putting them in the dryer, or you can wash the dishes in a double sink instead of using a dishwasher. However, if you find the concept of living without these appliances too inconvenient to take seriously, buy the most energy-efficient appliances you can find when you're shopping for new electrical goods, and choose gas over electricity in the kitchen.

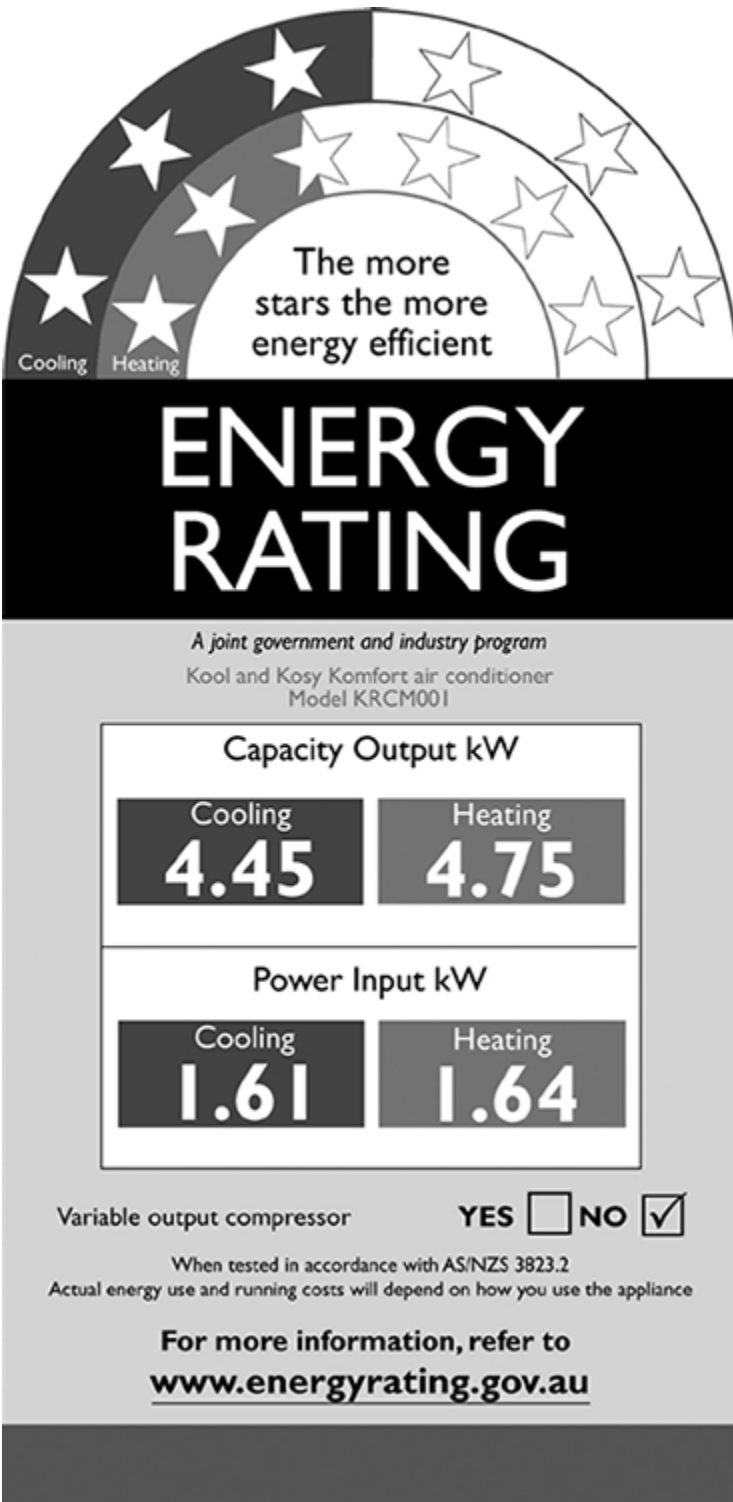
It's all in the ratings

You may already be familiar with the energy rating labels displayed on electrical whitegoods at your favourite department store. This mandatory labelling system, developed by the Australian Greenhouse Office and called the Australian Appliance Energy Rating Scheme (ERS), is designed to help you better understand the energy efficiency of the products you're buying. The greater the number of stars displayed on the labels, as shown in Figure 1-1, the less electricity the appliances use compared to similar products on the market. Appliances that have both hot and cold settings, such as a reverse-cycle air-conditioner, show two bands of star ratings on its label (see the

image at right in Figure 1-1). Remember also that appliances with higher star ratings emit less greenhouse gases, too.

Figure 1-1:
Energy rating
labels for a
refrigerator
(at left) and a
reverse-cycle
air-
conditioner
(at right).





Energy rating labels also contain a number that may be difficult to decipher at first glance. This number is, in fact, an estimate of the energy an appliance consumes in kilowatts (kW) under

standard conditions over a given time. The number actually provides a more accurate way of comparing the energy efficiency of similar models.



You can look up the energy-efficiency ratings of various brands of air-conditioners, clothes dryers, washing machines, refrigerators and freezers online at www.energyrating.gov.au. I also compare the energy-efficiency ratings on popular brands of appliances in Chapter 2.



Calculate your energy efficiency

Many electrical energy suppliers and renewable energy traders provide online calculators to help you calculate your energy efficiency. For example, electricity and gas provider Origin Energy and renewable energy trader Climate Friendly offer excellent step-by-step calculators that you can use to see the impact of your electrical consumption patterns. The results also show you how much offsetting your carbon dioxide emissions with renewable sources can cost you.

To test how these work, I used the energy-efficiency calculator on the Origin Energy Web site (www.originenergy.com.au/efficiency/#calc_intro) to compare the cost of different levels of electrical usage and how much greenhouse gases were emitted. I compared the annual use of electricity for a household living in a two-bedroomed apartment with 4-star appliances against a similar household using 2-star appliances.

Entering average data for use of electricity in all rooms of the 2-star appliance home yielded a total yearly electricity bill of \$634, with 5.64 tonnes of carbon dioxide generated. By comparison, the household using

4-star appliances attracted an annual bill of \$568 and generated 5.04 tonnes of carbon dioxide.

By the way, 5.04 tonnes of carbon dioxide is the same amount that 1.92 cars driving on the road (averaging 15,000 kilometres a year or 41 kilometres a day) emit into the air each year. Notice the cost savings that take place in the energy-efficient household.

These calculations show that you can easily cut in half the amount of electrical energy you use.

To calculate your energy usage, visit Origin Energy or the Climate Friendly Web site at www.climatefriendly.com.au. Look for the energy-efficiency calculator to get started.

Becoming an Energy Star

Some electrical products aren't covered by the ERS system, including TVs, home entertainment systems, computers and printers. Many of these electrical must-haves are covered instead by the *Energy Star* system (shown in Figure 1-2), which means they have the ability to go into *sleep* mode when not being used, thereby greatly reducing the energy that was once spent when just left on or put into *standby* mode. Sleep mode is more energy efficient than standby mode because many more of the parts in the appliance are turned off, which means less energy is consumed.

Figure 1-2:
The Energy
Star label.



To help you decide to use an Energy Star product, looking at the pros and cons is a worthwhile exercise. For people who just leave things on, Energy Star products do save energy: For example, sleep mode uses 75 per cent less energy than standby mode. Then again, you may believe in encouraging people to turn the appliance off altogether because sleep mode still requires some energy. Turning something completely off at the power point saves more energy than both sleep and standby modes.



Don't believe anyone who tells you that turning an appliance off and on again uses more energy than leaving the appliance in sleep or standby mode. Remember, *off* is the most energy-efficient mode for any electrical appliance. By itself, standby mode accounts for 4 per cent of domestic energy consumption.

Cooking with gas

Although a fossil fuel resource, natural gas is more energy efficient than electricity. The most popular household natural gas appliances in homes are ovens and cooktops. The more efficient performer of the two is the cooktop. A gas cooktop produces half the greenhouse gases of a standard electric cooktop, and uses less energy, too.

A gas oven also usually produces less greenhouse gas emissions than an electric oven. However, the differences between these two aren't so clear cut, because some gas ovens use more energy than their electrical equivalents — especially if the gas oven isn't *fan forced*, using an inbuilt fan to circulate the heat.

The wonder of gas

Luckily, Australia has large reserves of natural gas. Using natural gas in the home has many advantages over using electricity. Piping gas direct to you is more efficient than converting it to electricity and then sending that to your house in wires. Natural gas (methane) is also a more efficient fuel than other fossil fuels because you use less of it to get the same result. The other big advantage is that natural gas produces only one-third the greenhouse gas emissions than that from coal-powered electricity.

Natural gas is also better than liquid petroleum gas (LPG), the other main commercial gas product on the market. Although both have similar rates of greenhouse gas emissions, LPG needs to be transported in tankers or trucks, which are major greenhouse gas contributors, too. By comparison, natural gas is delivered by pipe direct to your home.

If natural gas is available in your area, I recommend you use it. You can use natural gas in your home for:

Cooking, in ovens or on cooktops.

Boosting the heat in your solar hot water system.

Heating your home, using portable or fixed heaters — when rugging up doesn't do the trick.

Stoking your barbecue.



If you already have gas appliances in the kitchen, get into the habit of using the cooktop — even if your gas oven is a fan-forced model. Steaming, boiling or stir-frying dishes on a gas cooktop is more energy efficient than cooking food in an oven or even a microwave. For more information about how to be sustainable in the kitchen, check out Chapter 2.

Lighting Up Your Life

Any architect or interior decorator can tell you that lighting is a critical component in designing a home. For example, the right kind of lighting can transform your kitchen and save you lots of money, too.

The light that pours out of cities and towns at night is visible from space, and is the reason the night sky is invisible to most city dwellers. But if you visit the country on a clear night, the number of stars in the sky simply boggles your senses. Most lighting is public, or commercial; domestic lighting accounts for 'only' 5 per cent of energy consumption in homes. The average Australian home, though, still produces more than one tonne of carbon dioxide each year.



The best way to cut back on your lighting bill is to turn lights off when they're not being used.

Planning appropriate lighting

Good design and good energy use are in agreement on this one: If you put the lighting where you need it, you need less lighting and end up with a warmer, cosier environment to live in.

Smaller, individual lights dotted around rooms provide a much better atmosphere and more alternatives for lighting a room than one single, strong light.

You need good lights in doorways and entrance areas, as well as over work areas in the kitchen, bathroom and laundry, and in study areas. Living and sleeping areas want subdued lighting at certain times. This option can be achieved in a variety of ways: You can use low-voltage uplights in corners for subdued lighting, and strong ceiling lights for those times that require good vision.



Some energy-saving lights don't work well with dimmer switches. If you use dimmers to subdue the lighting in your home, look for globes designed for the purpose.

Seeking the low-energy glow

Alternative forms of lighting can help you reduce the amount of energy you spend on lighting your home. Each of the following types of lighting has its own characteristics, which make it suitable for some areas but not others.

Incandescent tungsten

The traditional light globe with a little coiled wire inside is called *incandescent tungsten*. These lights consume between 60 and 100 watts of energy. Unfortunately, six of these lights used for four hours a day produce a tonne of carbon dioxide every three months (that is, if your electricity comes from a traditional coal-fired power station).

Incandescent tungsten lights provide a bright yellow and red light that creates a sharper edge to objects, which gives objects better definition.

Halogen

Similar to tungsten, except the colour characteristics are more constant over the colour spectrum. Halogens create a brighter light for the same power use and are often used to highlight ceilings and walls to reduce glare.

Halogen lights have a number of ecological drawbacks, mainly because of the way they're installed. Electricians scatter them

widely, adding to their power consumption. They're usually installed in the ceiling by cutting a hole in the insulation to release the heat they produce. This reduces the effectiveness of your insulation considerably. As well, they're mostly installed with a transformer attached to each light globe, wasting power and producing more heat in the ceiling cavity.

Fluorescent

Compact fluorescents are the darling of energy savers because they consume around one-sixth of the electricity that an incandescent globe of similar brightness would.

A fluorescent light produces a softer light that blends objects into the background, making them harder to see. It gives off blue and green colours, which are harder on the eye. A full-spectrum fluorescent allows the eyes to see items in a natural state, and is still a soft light.

Because fluorescents don't generally work with dimmers, many people are reluctant to use them in their general living areas.

LED down lights

An emerging replacement for halogen lamps, these low-powered, solid-state lights are true energy savers, but also require transformers to convert your mains power into low-voltage direct current.

LED down lights tend to throw a blue-white light, with some of the same characteristics as halogen lamps.

Plasma lighting

Though not commercially available at the time of going to press, this revolutionary new form of lighting comes in sheets. Rather

than globes, you can place artificial skylights and windows onto ceilings and walls, even incorporating works of art into the light itself. Some companies are working on transparent plasma lights that are designed to operate as windows during the day and lights at night.

Developers of plasma lighting say that the light it throws is similar to that produced by plasma televisions and computer screens. This has similar qualities to fluorescent and LED lights: It diffuses the light, so doesn't define edges well.

Switching your globes for free

An increasing number of companies around Australia are happy to come to your house to remove your old tungsten or halogen globes and replace them with new fluorescent ones. Sound too good to be true?

Local councils and carbon offset companies subsidise lighting companies to offer this service as their contribution to reducing the amount of greenhouse gases that they contribute through their everyday activity (their *carbon footprint*). Carbon offset companies allow you to offset your flying and driving miles (and any other activity that creates greenhouse gas emissions) by putting your money into carbon offset programs, such as replacing light globes with more energy-efficient ones.



Contact your local council for further information on whether they or any local companies are available to switch over your light globes for free.

Becoming an Alternative Energy Convert

Electricity is easy to generate. Unfortunately, the majority of electricity in this country is produced by burning coal, a huge polluter and one of the main sources of greenhouse gases that cause global warming. However, a number of alternatives to coal exist.



Most power plants burn fossil fuels, like coal, to make electricity. Mechanical energy is changed into electrical energy by burning the fuel in a boiler to produce steam. The pressure that builds up powers a generator that creates a magnetic field, which in turn causes the electrons in masses of copper wire to move from atom to atom, creating electricity.

This means that a lot of coal is mined (or oil is drilled) to meet your electrical energy demands. Reducing your reliance on this type of electrical power and converting to more sustainable, alternative energy sources is one way to become more energy efficient.

By the way, are you wondering whether nuclear energy is a 'green' power source — or safe? To find out more, see the sidebar 'Is nuclear energy sustainable?'

Understanding 'green' power

The following three sources are collectively known as '*green*' power, or renewable power, and are the main alternatives to powering your home with fossil-fuel-generated electricity:

- ✓ **Solar power:** Energy from the sun is the most popular alternative energy in Australia. Large-scale solar power plants using *photovoltaic cells* (solar panels) use lenses or dish-shaped reflectors to concentrate the sunlight on the panel, making them more efficient. Another system uses mirrors that look like satellite dishes to track the sun and concentrate heat at one point. The incredible heat focused at that point can be used to drive an engine to create electricity.

Solar hot water systems work differently. They simply trap heat from the sun. For more information about solar hot water systems, see the section, 'Using the sun to heat your water', later in this chapter.

- ✓ **Wind power:** Energy from the wind propels the blades on a wind turbine to create energy within a generator to produce electricity. Traditional wind turbines usually feature three large propeller blades that face the wind. The current big turbines are about 65 metres in diameter. Because of their size, this style of turbine can only operate at moderate wind speed. New, vertical axis models overcome this problem and can operate at high speeds. Domestic turbines use different designs. For example, the Hush Turbine developed by Melbourne inventor Arthur O'Connor (shown in Figure 1-3) uses small blades that can turn at high speeds to generate electricity efficiently.
- ✓ **Hydro power:** This well-established technology uses water cascading through large pipes to spin turbines that produce electricity. Although this method doesn't emit nasty greenhouse gases, hydro-electricity still impacts on the environment to a certain extent because the method interferes with the natural flow of rivers, and

the dams often drown large areas of arable land. Small domestic hydro-power units suit properties that have their own source of continually flowing water.

Is nuclear energy sustainable?

Those in favour of nuclear energy proclaim its virtues: Cleaner, greener and the only alternative to coal with the ability to produce a large amount of energy from a relatively small amount of fuel.

Confused? Perhaps you're like me and have always considered that nuclear energy is bad for the environment — dangerous and toxic, and the waste generated by a nuclear power plant is a major global issue.

Well, here's what I have gleaned about the role that nuclear energy can play as an effective alternative-energy fuel:

A nuclear power plant generates power basically the same way a coal power plant does. The uranium undergoes a process called *fission* (a nuclear reaction that releases energy), which heats the surrounding water to generate enough steam that is then fed into a turbine generator. The big difference between coal and nuclear energy is that greenhouse gas emissions aren't produced during the fission process.

Those in favour of nuclear energy state that a nuclear power plant generates a reliable source of power that isn't reliant on the vagaries of weather (as wind and solar power are). And as long as the waste is contained, no-one's health is in danger.

Opponents of nuclear energy state that the extremely toxic and long-living radioactive waste generated from fission is enough of a disadvantage to rule it out as an energy alternative — nuclear energy is just too dangerous to human health to even contemplate. For example, how can countries and organisations guarantee that the waste can be contained and disposed of safely? If released, plutonium (the main element of nuclear waste) is so toxic that the just a minute amount can cause cancer in anyone exposed to it.

People opposed to nuclear energy also believe that the potential to use the uranium to create nuclear weapons is too great a risk.

One of the reasons why Australia is so keen to promote nuclear energy as an alternative power source is that Australia has large amounts of uranium ore (the Uranium Information Centre states that 28 per cent of the world's uranium supply is found in Australia).

So, from a sustainability perspective, you don't find me recommending nuclear energy as an alternative energy source in this book. Although some countries have started to increase their reliance on nuclear-generated electrical energy because it offers economic and environmental advantages, the waste and health issues realistically rule it out as being wholly sustainable.

Figure 1-3:

A quiet domestic wind turbine resembles a jet engine rather than a propeller.



Signing up for 'green' power

You have two ways in which you can make the conversion to 'green' power. One way is to produce your own 'green' power at

home using one of the technologies I outline in the previous section. The other is to buy renewable energy instead of coal-fired power.

Many electricity suppliers across the country now allow households to sign up for 'green' power. Although this option is slightly more expensive, the extra money you pay is invested in renewable energy sources. If everyone signed up for 'green' power, renewable energy would become the dominant source of electricity in Australia.

In Australia, companies such as Neco and One Stop Green Shop, do a similar thing independent of the power companies. These energy traders allow you to invest directly in renewable energy. You get two bills: You still pay an electricity company to deliver your power, but you also pay the energy trader to generate the same amount of power from all renewable sources. The advantage here is that you know your money is being invested in building new power plants using renewable energy.

Some people think that paying more for 'green' energy than for coal-fired power is absurd. But until demand increases for cleaner alternative energy sources, and initiatives like *carbon trading* are implemented as a way of penalising companies that own and operate coal power stations for the greenhouse gas emissions they produce, renewable energy is set to remain more expensive.



The Australian federal government offers a 'green' scheme whereby companies and individuals who install their own renewable power sources or solar hot water systems attain certificate points through Renewable Energy Certificates (RECs). You can on-sell RECs to electricity companies that need to meet certain energy-efficiency targets. This process

effectively reduces the cost of installing solar water systems. For more information on this scheme, visit www.orer.gov.au.

Using the sun to heat your water

A solar water heater can provide between 50 per cent and 90 per cent of your total hot water requirements, depending on the climate in your area and the model of heater you buy.

The basic principle is simple: Cold water is spread out over the roof in pipes or glass tubes and is heated by the sun. The water is then pumped, or moved by its own heat, into a holding tank while more cold water is heated up. On a sunny day the water quickly reaches boiling point, so all systems are fitted with safety devices to stop the water from getting so hot that it burns people.

Just love that piping hot water

According to the Australian Greenhouse Office (AGO), in most households hot water is the largest energy cost and cause of greenhouse gas emissions. In fact, heating water accounts for about 27 per cent of an average household's total greenhouse gas emissions and energy use.

This practice is an incredible luxury, especially when you consider the low cost of getting the sun to do it for you. If you can't afford to install a solar hot-water service, you can save energy by installing water-efficient fittings and appliances in the home.

Several types of solar heaters are on the market, all with different characteristics and varying degrees of energy efficiency. Here is a run-down of the different solar heating models you may encounter:

✓ **Passive water collection heaters:** Cold water is collected in a tank in the roof, which is heated during the day by solar panel plates. Passive systems are the most energy-efficient solar heater because they don't use electricity to pump the water. You can choose between two types:

- Open circuit system, where water flows directly from one tank to another.
- Closed circuit system, where a heating fluid is warmed in the tank and then the heat from it is transferred to the water already sitting in the collection tank. The closed circuit system is commonly used in areas that experience frosts or freezing conditions in the winter. The fluid used to generate heat for the water in a closed-circuit system has anti-freeze properties.

Passive systems use either gravity fed or closed-coupled flow. The gravity-fed model has the water collector situated above the storage tank in the roof, and normal gravity moves the water through pipes from collection to storage and through to your taps. The closed-coupled system has the collector below the storage tank and uses normal water pressure to get the water to storage and through to your taps.

✓ **Active water collection heaters:** If you have limited space in the roof or a traditional hot water system, you may go for an active rather than a passive system. The storage tank on an active system can be located on the ground or under the house, with the heated water pumped from the collector tank to the storage tank.

- ✓ Active pump systems, like the one shown in Figure 1-4, are good for converting your existing tank to a solar powered system, but you need to power the pump somehow, and the obvious way, unfortunately, is with electricity.

Figure 1-4:
An active
solar hot
water system.



No matter which type of solar power system you choose, be sure to position the solar panel in the roof at an angle that takes advantage of the sun's rays. Also, think about what size tank you need to cater for your family; try not to buy something larger than you really need.



Whether you choose a passive or active solar water-heating system, if the sun's not shining, your solar power system can't heat the collected water. To overcome this, you can buy a *booster* to heat the water when the temperature falls below a certain point. The boosters can be powered by electricity, gas, petroleum or diesel.

However, boosters can waste energy if they're used too often. In fact, some boosters require more energy than normal off-peak electrical hot water systems. Your best bet is to install timers if you find your booster system is being used too much.



Rebate programs are available from federal and state governments to eligible householders who install solar water systems:

- ✓ The federal Photovoltaic Rebate Programme offers a cash rebate for the installation of solar photovoltaic systems on eligible homes. For information about residential eligibility and to download a residential applicant's kit, go to www.greenhouse.gov.au.
- ✓ The federal Solar Hot Water Programme provides rebates of \$1,000 to install solar and heat pump hot water systems in existing eligible homes. Visit www.greenhouse.gov.au.

- ✓ Each state government offers additional rebates on installing solar hot water systems, although the rebate you can get varies from state to state. Rebates range from \$300 in Western Australia to \$1,500 in Victoria. You can ask the company you're buying your solar hot water heater from for further information on the rebate available to you.



To find out more about solar water-heating systems, including buying a suitable unit for your home, check out the AGO's Technical Manual for Environmentally Sustainable Homes at www.greenhouse.gov.au/yourhome/technical/fs43.htm.

Going the whole hog: Getting into the power business

Instead of spending your money on paying someone else to produce 'green' power, you can create your own. Domestic solar panels, wind turbines and hydro power are reasonably affordable and make you virtually independent of the big power companies. If you produce all your own power needs, you never have to pay a power bill again or suffer from a power shortage (providing your own generators keep on ticking, of course).

You don't need a freestanding house or, more to the point, a large roof to run a solar power system. The truth is that many modern apartment buildings are also being designed to have much of their water heating and electrical needs centrally powered by solar energy. However, if you want to install a new solar power system, it helps if you have your own detached house, because you need *body corporate approval* (approval from the apartment complex) to install something new.

Besides space, you may also need approval from your local council to install domestic solar panels, wind turbines and hydro power.



Most people already connected to mains electricity remain connected, even after installing solar panels, wind turbines and hydro power. Staying connected to mains electricity protects them in case their gear fails, or it produces less energy than they expected. Staying connected also gives them the opportunity to earn income from their 'green' power by selling it back to the electricity supplier. To do this they also need to install a reverse meter to measure the amount of electricity fed back into the electricity grid.

Designing Your Sustainable Dream Home

Perhaps you're about to renovate your existing home, build a new one from scratch or move to a new home or apartment in a brand-new location. Whatever the case, you need to consider some key design elements before spending your hard-earned dollars to achieve a more energy-efficient and sustainable home.

Designing for energy efficiency

Did you know that 15 per cent of all the energy used in Australian cities is consumed inside homes, and the fastest-growing usage of electricity is for domestic air-conditioning? Many homes aren't designed well enough to enable adequate

ventilation, and a large number of homes run powerful energy-inefficient air-conditioners to cool rooms as quickly as possible.



An energy-efficient house reduces the need for electrical or gas-powered energy sources by using sustainable energy alternatives, especially for heating and cooling. You can achieve this by

- ✓ **Capturing the sun:** I mention this in preceding sections in this chapter, and because the practice is so effective I'm saying it again: Ensure that the living areas are located on the northern side of the home, with as many windows as possible on the northern walls to capture the sun's rays in the winter. You can also use solar heating to warm parts of the home.
- ✓ **Insulating:** The insulation in the internal building structure, the type of windows you use and the way you decorate rooms all play a part in insulating your home to reduce your need to resort to turning on the air-conditioner or heaters.
- ✓ **Shading:** The position of outdoor vegetation can shade your home in summer. Installing awnings and screens on windows facing north and west also helps keep the temperature down in summer, reducing the need for air-conditioning.



The wall that faces the sun most often, usually the northern wall in Australia, can be insulated, or it can make use of *thermal mass*. Whereas insulation blocks the flow of heat, thermal mass absorbs it, then releases it later. For example,

materials such as concrete and brick absorb rather than reflect heat, so they have a high level of thermal mass because they allow heat to travel through them. By using thermal mass on the northern wall, or on the southern side of north-facing rooms with large windows, you can take advantage of sunny winter days and cool summer evenings to reduce your heating and cooling requirements. The correct use of thermal mass requires specialist understanding, so make sure your architect or an adviser explains these concepts to you. Get a second opinion just to be sure.

Obviously, the way you live at home also affects the amount of energy you use. In Chapter 2, I provide some practical advice on how to outfit your home with energy-efficient appliances and adopt a sustainable lifestyle.

Seeking the sunny side of the street

Some streets are better placed than others, and each property has its own advantages and disadvantages. Here are some things to consider that can directly impact on your sustainable dream home:

- ✓ One of the primary influences on your energy use is the way the sun falls on your garden and your home. In Australia, the sun is to the north in the winter, so the northern side of your house is where you would place solar hot water services, electricity panels and vegetable gardens. If the house is shaded to the north, this could be problematic.
- ✓ Prevailing winds also influence your plans for cooling the house and keeping it warm, your planting program and whether you can produce electricity from wind energy or not.

- ✓ In areas where heat is a major consideration, the westerly aspect deserves special consideration. Are you able to shade the western side of the house in summer?
- ✓ The slope of your land, and the height of the bathroom and kitchen floor, impacts on your ability to recycle waste water. If you plan to run water from the house into your vegetable garden, consider where to place the two in relation to each other.
- ✓ Your immediate neighbours can also have a significant influence on whether you're allowed to install a composting toilet, put up a domestic windmill or even keep hens. It may be worth doing a little investigation into local community attitudes (and local council) to be sure you can act on your plans.

Insulation

Insulation is a key design element in any energy-efficient home. Insulating your ceilings, floors and walls can play a major role in your ability to stay cool in summer and warm in winter — without turning on electrical appliances.

You can use bulk or reflective insulation in your ceiling, floors and walls. Window thickness can act as an insulator, too. Here's the lowdown:

- ✓ **Bulk insulation:** This stuff traps much of the heat that transfers into and out of the home. Insulation batts and blankets made out of glass 'wool' are the most common form of household bulk insulation. Some of the more sustainable bulk insulation includes cellulose made of recycled paper pulp (which is pumped into cavities), rockwool (melted volcanic rock that forms a 'wool'),

natural wool and recycled polyester threads that are non-toxic. Most of these insulation types are generally supplied to larger-scale industrial or commercial buildings.



Most residential bulk insulation is made from glass and fibreglass products, which can add to the mineral particle pollution found in the home, especially as they're being laid.

✓ **Reflective insulation:** Sheets of reflective foil (usually aluminium) stuck to panels of paper or plastic. As the name suggests, these panels help reflect the heat generated outside or keep the heat generated inside. It also reduces humidity collecting in the insulation. Reflective insulation is usually used in walls in addition to bulk insulation. Given that aluminium is the most common form of reflective insulation and that aluminium is a highly processed metal, this is a classic embodied-energy versus ongoing-energy-savings dilemma. Because it reduces your electrical heating and cooling requirements with no negative health impact, reflective insulation remains on most sustainable architects' list of useful products.

✓ **Windows:** Glass thickness, the sizes of your windows and the number of windows in a home (plus their furnishings) all play a role in insulating your home. The type of glass in your windows has a major impact in keeping heat in or out. For example, double-glazed windows and doors are commonplace in the colder regions of the world.

It may be difficult to find insulation alternatives to the 'glass wool' variety of insulation batts found in Australian stores. If

your only option is to buy glass or fiberglass insulation, check for those that have been produced using recycled materials.



The following Web sites help you get a better feel for the type of insulation you need to heat you up or cool your place down:

- ✓ **Choice Australia** (www.choice.com.au): Choice Australia is the independent advisory service on consumer products and provides a calculator to determine your insulation requirements. Go to the Web site and click on Products then Heating/Cooling to find the heating and cooling calculators.
- ✓ **Insulco** (www.insulco.com.au): This Australian insulation batts company calculates the types of batt you require based on where you live (which takes into account your climate) and the size of the area you want to insulate. Check with the company to see if they can provide you with batts that use sustainable materials.
- ✓ **Window Energy Rating System (WERS)** (www.wers.net): WERS rates a window from 0 to 5 in being able to block the sun. Check the Web site for more information on what to look out for when buying windows for energy efficiency.

Chapter 2

Energy Efficiency — Room by Room

In This Chapter

- ▶ Creating people-friendly living areas
 - ▶ Working energy-efficiently in the kitchen
 - ▶ Making your bedroom your comfort zone
 - ▶ Washing and drying your clothes naturally
 - ▶ Swapping from power tools to manual
 - ▶ Homing in on the highest-rating appliances
-

Understanding the whys of energy efficiency is just the beginning. If creating an energy-efficient home is your main goal, this chapter is for you. By reducing your power bill, you not only save money but also greatly reduce greenhouse gas emissions.

Taking you inside the home, room by room, I show you how to take lifestyle-changing steps towards minimising your energy use. I describe some ‘green’ practices that you and members of your family can adopt.

This chapter also looks at the how to be more energy efficient with your choice of electrical appliances for your home.

Making Your Living Room a Comfort Zone

Your living room typically reflects the values you live by. The living room is usually the showpiece of the home. The most expensive furniture and appliances are located here, along with the family photos, framed paintings and prized collections. This section shows you many ways to bring your concern for the environment into the same room with these other things you value.

Most living rooms are high-traffic areas and are set up to be the most comfortable area in the home — who doesn't like making a beeline for the sofa after dinner? Air-conditioning and heating are concentrated here, and lighting and entertainment systems grace the space.

In Chapter 1, I explain why good insulation helps maintain a comfortable temperature and reduces your consumption of electrical energy. Here I provide some initiatives to help you reduce your electrical energy consumption even further.

Getting real on entertainment systems

Some people's living rooms resemble a retailer's home entertainment showroom. I can't believe the size of the TVs — or are they movie screens? — in some of the homes I visit.

Do you really need a movie-sized TV screen or has the affluenza virus driven you to keep up with the Joneses? It might be more satisfying to show off a hand-woven rug by a local artist, a tropical fish tank or your child's art projects (an ongoing gallery that changes often) than to have the same big screen as all the

neighbours. The hand-woven rug is likely to be worth more in ten years, too — and who knows about your child's artistic career if encouraged? The point is to think consciously about what fulfills you, and your family's actual wish list for fun and relaxation rather than simply assuming the latest gadget is going to bring long-term joy.

The first question to ask is: Do you really need it? In other words, to what extent do you suffer from the affluenza virus? Do you really need to have a movie screen-sized TV when exactly the same message can be obtained from a smaller 51-centimetre TV?

After you decide on the appliances and entertainment devices that are an important part of your lifestyle, use the advice in the section 'Buying Energy-Efficient Appliances', later in this chapter, to buy the longest-lasting and most energy-efficient ones. Whatever appliances you have, the way that you use them has the greatest impact on the energy you use.



For example, try to get into the habit of not turning things on just to create some background sound or vision. Only turn on the device if you really want it on; likewise, turn it off if you're not watching it or listening to it — especially if you actually leave the room. Reminding children to get into these habits often helps parents to remember them as well.

Lighting your lifestyle

How you use lights has an impact on your energy bill. The key to using lights efficiently — especially in large living areas — is to use them sparingly.



Here are some more pointers to help you save energy:

- ✓ Turn off the lights when you leave the room. Basic, I know, but you may be surprised how often people overlook this practice.
- ✓ For subdued lighting, use a lamp instead of dimmers. Lamps provide clear direct lighting where you need it (say, for reading). You can also select a globe that uses minimum energy.
- ✓ For romantic lighting, turn off the lights and light a few candles instead. (And definitely don't forget to blow them out when you leave the room, though you're actually more likely to be mindful of blowing candles out than switching lights off.)
- ✓ When everyone sits down to dinner each night, take a quick tour of the house and count the number of lights on. Turn them off and announce the count to the family — eventually, your nightly walkabout is going to irritate them to the point that they switch off, too (the lights, that is, and hopefully not their ears).

For best results, design the lighting in your home to be as energy efficient as possible. For details about the different types of lighting you can use in the home and their suitability for different areas, refer to Chapter 1.

Going Energy-Friendly in the Kitchen

Your kitchen is where you can have a major impact on your ability to live a more energy-efficient lifestyle at home. The food that you buy, the way that you store it, the methods you use to prepare and cook meals, and how you decide to clean up afterwards, can all be sustainable activities if you work in your kitchen thoughtfully.

Stock taking your appliances

Like most people, when you walk into your kitchen you probably rely heavily on electrical appliances — so much so that you may find it hard to imagine living without them. After all, the late-night infomercial promises your cooking can become gourmet overnight with the new electric slicer-dicer-blender-whirrer-espresso machine! But the more you use these appliances, the more your electrical energy consumption goes up. The appliances in your kitchen may include the following:

- ✓ **Fridge (or combo fridge/freezer):** Okay, you need this appliance. Who can realistically get by without a greenhouse gas-producing, electrical energy-sapping refrigerator, especially when a lot of the food sold in supermarkets states on the label that you must ‘refrigerate after opening’? However, some fridges are better than others. For details, see the sidebar, ‘How nasty is your fridge?’.
- ✓ **Stand-alone freezer:** Usually a staple in larger households and in rural areas, the freezer works just like a fridge, only it’s colder (and hopefully not opened as often).
- ✓ **Dishwasher (not the human variety):** Once a luxury, the automatic dishwasher is now a standard kitchen appliance in many homes. Dishwashers use a lot of water

and electrical energy to heat the water, then more electrical energy to dry the dishes.

- ✓ **Electric oven:** Thanks to the cult of worshipping TV chefs, the electric oven is more popular than the gas oven in Australian homes, even though electric ovens are less energy efficient (refer to Chapter 1 for more details).
- ✓ **Microwave:** ‘Brrrrrr — ping’! The microwave is considered an essential cooking and heating device, but some people also use the microwave for defrosting. (For shame!)
- ✓ **Lots of other appliances, large and small:** On your bench sits an electric kettle, electric toaster and maybe an electric coffee maker. Take a look in your cupboards and drawers and count up all the electrical appliances and gadgets you own: Perhaps you’re hiding an electric food processor, electric frypan, electric sandwich maker, electric juicer, electric blender, electric coffee bean grinder, electric carving knife and an electric can opener? Don’t forget the electric ice-cream maker you use once every summer.

I know, I know, you’re probably thinking that I’m now going to tell you to sell your freezer, microwave and other electrical stuff on eBay. Don’t worry, I’m not. (Anyway, if you’re like lots of other people I know, you probably rarely use many of the smaller kitchen appliances.) But the right appliance for the job can actually save energy. A toaster, for example, uses less energy than an electric griller.



Take into consideration the energy efficiency of appliances you intend to buy. Purchase only appliances with the highest number of energy efficiency stars — refer to Chapter 1 for more details about energy-efficiency ratings.

Of course, doing some simple kitchen tasks — such as squeezing oranges — by hand not only saves your electricity usage, but saves the energy and resources that is spent manufacturing an electric juicer. And you may be surprised at how many non-electric tools you can find for specialised tasks in antique shops; previous generations made some highly efficient juicers that are still perfectly usable today.

Here are some more tips you can follow to reduce your energy consumption in your kitchen:

✓ **Refrigeration:** Keeping the temperature constant and being organised about how you store things in the fridge/freezer is the key to making this appliance work at its best.

- Minimise how often you open the door — yes, the light magically turns off when you shut the door, but the fan and coolant that spring to life when you open the door don't.
- Find the thermostats in both the fridge and the freezer compartments and set them to energy-efficient temperatures: 3 to 5 degrees Celsius for the fridge and -15 to -18 degrees for the freezer. Any higher or lower and you're unnecessarily consuming energy.

✓ **Defrosting:** Plan what you're going to eat the day before so you can defrost the food without needing to thaw it in

the microwave. Take your frozen food out of the freezer in the morning (or the night before) and put it in the fridge. When you get home in the evening, your food is defrosted quite a bit and doesn't require much more thawing, if any.

- ✓ **Cooking:** Develop a cooking method that increases your reliance on a gas-powered cooktop (if you've got one) and decreases your reliance on electrically powered ovens (for more details about using gas appliances, refer to Chapter 1). Even a microwave oven is a more energy-efficient cooking appliance than an electric oven.



If you have favourite family meals that cook best in the oven, try to cook more than one thing at once. For example, if you bake a casserole for an hour at a moderately high temperature, you can simultaneously bake a dessert. If the dessert requires a different temperature, at least use the preheated oven and bake the second item immediately after the first comes out.

- ✓ **Washing up:** Reduce your use of the dishwasher by washing up some of the smaller plates, knives and forks in the sink. When you do use the dishwasher, always wipe or scrape off food scraps before stacking them (to stop clogging the drains and to reduce the need to use hot water washes) and only turn the dishwasher on when it's full. As soon as a cycle is done, turn it off and open the door so that the dishes dry naturally, rather than via the dishwasher's heater. Finally, when buying your highly-rated energy-star dishwasher, look for a model that provides an economy cycle and includes cold water along with hot water connections.

How nasty is your fridge?

The fridge is one of the most important appliances in the home. Your fridge and freezer use refrigerant gases to keep temperatures low enough to help preserve your food.

In the past, chlorofluorocarbons (CFCs) were commonly used as cooling agents. By 1986 a quarter of all global CFC production was for refrigeration, but when the hole in the ozone layer was discovered, CFCs were blamed because not only do they produce damaging greenhouse-forming gases, they also release a high proportion of chlorine atoms — the main culprit for ozone depletion. Fridge makers (and air-conditioning makers as well) were ultimately forced to find new cooling agents.

Refrigerator makers then turned to hydrochlorofluorocarbons (HCFCs) and hydrofluorocarbons (HFCs) as cooling alternatives because, in HCFCs' case, they release a lower proportion of chlorine atoms and have fewer long-term effects. HFCs actually release no chlorine atoms. This may have been okay if the ozone layer had been intact but, unfortunately, HCFCs still release enough chlorine atoms to damage the remaining ozone. HFCs also produce enough greenhouse-effect-forming gases to exacerbate the problem.

So, once seen as a solution to phasing out CFCs, HCFCs and HFCs now also need to be phased out globally. One alternative is greenfreeze, a 'green' coolant promoted by Greenpeace, which uses hydrocarbon gases such as propane, butane and ethane for refrigeration. Hydrocarbons have no effect on the ozone layer, less impact on global warming than CFCs and HCFCs, are cheaper and are non-toxic. The energy efficiency of these hydrocarbon fridges also proves to be as good as, or better than, those cooled with CFCs or HFCs — they can use up to 70 per cent less energy. The most energy-efficient fridge currently produced is completely CFC- and HFC-free, with an energy consumption equivalent to a 15-watt light bulb. Alternatives are also being developed that use helium gas as the coolant.

Greenfreeze-type refrigerators are becoming increasingly available to the market — except if you live in the United States, where they have been banned because manufacturers there deem hydrocarbon gases unsafe. Thankfully, everywhere else, including Australia, considers these fridges as safe as any alternative given that the amount of gas used in greenfreeze fridges is the equivalent of three cigarette lighters.

An increasing number of companies are developing ozone-friendly low-greenhouse-gas-emission appliances, although most are made overseas. These companies include Electrolux, Liebherr, Miele and Vestfrost. Unfortunately, most of the fridges in Australian stores use CFCs and HCFCs as coolants, so you need to shop around to track down ozone-friendly, energy-efficient fridge models.

If you're not ready to replace your old fridge, check out HyChill, an Australian company that manufactures hydrocarbon refrigerants (but not the refrigerator itself). The company states that it can 'drop-in' refrigerants into domestic appliances that currently use the outdated and ozone-unfriendly gas systems. Check www.hychill.com.au for further information.

The ability to swap your refrigerants with environmentally friendly ones may become a great recycling solution, rather than throwing away your old fridge. If you're disposing of an old fridge, contact your local council so that someone can collect it and dispose of it properly. This approach is much safer than taking it to the dump yourself, where it slowly rots and releases all those bad ozone-depleting gases.

Storing and preparing food more efficiently

Storing food in the fridge, the freezer or the pantry each has different sustainable impacts.

Foods requiring refrigeration use up much more electrical energy than foods that can sit in a pantry until they reach their use-by date. Of course, some staples such as milk, butter, margarine and juices obviously require refrigeration, but with some planning and sorting you can reduce the amount of foods you put in your fridge and freezer.



Consider the following tips for reducing your refrigeration and freezer needs:

- ✓ **Buy fresh:** Buying your food as you need it means less work for your freezer; so much so that you may find you don't need one. The ability to buy fresh on demand depends on how close you are to the shops.
- ✓ **Downsize:** Does all the food in your fridge really need to be there? Foods commonly found in the fridge such as bread, peanut butter, condiments, cordial, some fruit and vegetables and even water can realistically be stored at room temperature. You may find that you can get away with operating a smaller, more energy-efficient fridge.
- ✓ **Increase your pantry space:** Putting as many foods in the cupboard or pantry as you can fit saves you many dollars on electricity used to refrigerate your food. Pantry foods include the many (recyclable) tin products on the market, cereals, sugar, spices, condiments and all your back-up supplies of long-life milk, soft drinks and alcohol. When you start canning your own home-grown veggies, they go on the shelves here as well!

Waking Up in the Bathroom

In the bathroom, you can wash your worries away. You can spend some quiet time by yourself, relaxing in your bath or showering away a day's worth of sweat and tears. Everyone's daily bathroom routines can also help reduce the stress placed on the planet from excessive energy use required to heat your water.

- ✓ **Reduce your showering time:** Sure, I know it can be difficult to take short showers, but if you set a daily time limit on your showering time, to maybe five minutes, you develop a routine that you can more easily stick to and one that reduces electricity used to heat the water.
- ✓ **Shave before (or after) you shower:** If you keep shower time for showering only, you can relax and enjoy it.
- ✓ **Trade your shower for a bath:** An average-sized bath holds approximately 150 litres of water, which translates into the same amount of water you use in seven minutes using a conventional shower head. So, if you take much longer than seven minutes, think of having a bath. Or, install solar hot water (refer to Chapter 1).
- ✓ **Turn off the tap:** When cleaning your teeth or washing your hands and face, don't let the hot water run.

This book is about conserving energy but if you're interested in the myriad ways to save water, check out another of my books, *Water-Saving Tips For Dummies* (Wiley Publishing Australia Pty Ltd).

Energising the Bedroom — Efficiently

Unless you're living a precarious or nomadic existence, you spend a third of every day in your bedroom, just sleeping. The bedrooms in most homes also take up a large percentage of household space, so they're also used as retreats or study rooms, and may include TVs or computer equipment.



I know that what you do in your bedroom is your own business, but you can live far more sustainably if you make this room, where you spend most of your time, naturally comfortable and energy efficient.

- ✓ **Minimise electrical equipment:** All electrical equipment gives off EMFs and ELF's — electromagnetic frequencies that may cause disturbance to the cells of your body. At the very least, turn off computer equipment at the switch before you go to sleep.
- ✓ **Organise the living space:** Work out the main activities that the bedrooms in your home are used for, then organise the rooms accordingly. For example, place desks or play areas near windows so that you or family members can make the most of natural light during the day.
- ✓ **Use natural bedding:** Choose materials that can keep you naturally warm or cool. For example, buy sheets and comforters made from hemp or organic cotton. Use woollen blankets to stay warm.

Sleeping without power

Because you spend a lot of time in your bedroom doing nothing except sleeping, you shouldn't be consuming energy during this

time, right?



Here's how to ensure that you use as little electricity as possible while you're asleep:

- ✓ **Add layers to stay warm:** Doonas or comforters are just as effective as heaters and electric blankets in keeping you warm. Layers of woollen blankets work well, too.
- ✓ **Use thermostats and timers:** Most heaters have automatic thermostats and timers that you can set so that they turn on only when air temperature drops to a certain low temperature, or at a set time — usually the early hours of the morning, just before you need to get up. If your heater doesn't have such a control, buy a timer to control when it turns on.
- ✓ **Let in the night air to stay cool:** Open windows during warm weather (but make sure your windows are fitted with screens to keep the mozzies out). Night time is always cooler than day time; opening the windows allows the cool air to enter. If the night is hot and still, use a ceiling fan or freestanding fan instead of an air-conditioner to help create ventilation.

Okay, sometimes you may need to resort to using artificial ways to cool down or warm up a bedroom. If you follow these tips and insulate your home as I describe in Chapter 1, you can greatly reduce your need to use air-conditioners, heaters and electric blankets while you're asleep.



You're not living sustainably if you leave the air-conditioning on all night to keep cool. And some heaters (like electric radiators) are big fire risks — these appliances cause most of those house fires you see reported on the news during the winter months.



Before you go to bed, go around the house and turn off all the electrical appliances (except the fridge and freezer, of course). Turn them off at the power switch, because energy is still being used when appliances are left in standby or sleep mode. (I talk more about how to save energy and using electrical appliances in Chapter 1.)

Encouraging kids

These days, kids' bedrooms are multifunctional — bedrooms are play rooms and study rooms, as well as places to crash out for the night. An increasing number of kids (and adults for that matter) are spending more time in their bedrooms than previous generations did. This is particularly true of bedrooms in apartments, which inevitably serve a variety of functions.

As well as equipping kids' rooms with natural furniture and furnishings to ensure they get a good night's sleep, you can encourage them to be more sustainable and save energy in their own space. For example:

- ✓ If an electrical appliance such as a computer, a monitor, a TV or electronic game is in the room, place a small sign nearby as a reminder to turn the appliance off at the switch. Or, place some subtle environmental and energy-efficiency messages, posters or books in different parts of the room. Don't overdo it, though — their room is their castle, too!
- ✓ Provide a low-wattage night light and show them how this provides enough light to help them find their way to the bathroom during the night. Older kids can turn on a low-wattage lamp. Even better, teach them to get used to the dark — after all, humans have slept in the dark for hundreds of centuries.
- ✓ Encourage a tidy and clean room so you don't have to use the electric vacuum cleaner more than necessary. Explaining why you require a tidy room — to save our earth — may get a more positive response than telling them to do it, 'because I told you to'.

To efficiently heat and cool kids' bedrooms, follow the same rules you apply to heating and cooling other areas in the home. Refer to Chapter 1 for more details.



Consider sharing a family computer or television rather than giving in to the current trend to put one in every bedroom. Working out a schedule of who gets to use the Internet when makes your family more mindful of how much time you're spending on it and whether you're Web surfing as efficiently as you could be. If you do allow your child to have a television or computer in his or her bedroom, lay down some ground rules about how long it can be on at a time and what time it definitely needs to be turned off. Teach your children that they can still play Solitaire without using energy — the old-fashioned way, with cards.

Cleaning Up the Laundry

The laundry is often the least-liked room in the home — it usually reeks of chores and hard work. All those detergents, bleaches, polishes and other chemical nasties can give a laundry a distinctly unsustainable smell, making it a no-go zone for children and an unfriendly place for you to visit, too.

Energy-saving washing

Thanks to good engineering, washing machines are easy to use — you can simply load 'em, then set and forget. A washing machine can use a lot of water and electrical energy, though, especially if you treat it as the workhorse in an above-average sized family.



Calculate how many times a week you put your washing machine through its paces, then use the following tips to save energy when washing your clothes:

- ✓ **Wash in cold water:** If you set your washing machine to the cold water cycle, instead of the warm or hot cycle, you're not using electricity to heat water. Usually, a cold wash is more than adequate for most loads; you can individually soak or hand-wash more troublesome items in hot water using a bucket.
- ✓ **Wash less often:** A small load of laundry may use less water, but it usually uses the same amount of electricity as a full load. (Make sure you don't overload your washing machine, though.)
- ✓ **Get a front-loading washing machine:** Front loaders use less water (and therefore less energy to heat the water) than top-loading washing machines. Some states in Australia even offer government rebates if you buy one of these water-saving washing machines. (For where to find energy-efficient front loaders, see the section 'Washing machines', later in this chapter.)

Drying your gear

Perhaps the weather's too wet or cold for drying clothes outside, you work long hours or you've got kids . . . a clothes dryer sure does come in handy! On the other hand, clothes dryers shrink, crease and contribute to wear and tear on clothes, and cost a fortune to run.

If you can't hang your washing on the clothesline outside, get yourself a drying rack or two: These are inexpensive to buy and can be set up anywhere in the home. In fact, a drying rack may be your only alternative to using a dryer if you live in an apartment, but keep in mind that strata restrictions may not allow you to put the drying rack on the balcony.



Yes, yes, I know — a full load of washing doesn't fit on a regular drying rack. I get around this by doing smaller washes so that everything fits on the drying rack. Using the washing machine this way may not be ideal, but this method is still more energy efficient than washing a full load in the machine and then stuffing some items in the clothes dryer.



If you really must use a dryer regularly, consider buying a model that runs on natural gas. The new range of gas clothes dryers are more energy efficient and cheaper to run than standard electric clothes dryers; the only prerequisite is that your home can access mains natural gas.

Powering Garden Tools by Hand

In the old days, all tools were powered by hand, from lawnmowers through to drills. Hand tools require a little more of your energy, but are often as fast and effective as the powered alternative. Working this way can also be better for you. No-one ever heard a Zen monk saying, 'When you switch on the leaf blower, do it with all your energy and attention and find stillness within'.

If you decide to give away, resell or safely dispose of all the unsustainable products from your tool shed and garage, all you should have left are some manual tools that enable you to be a do-it-yourself handyman without expending any energy other than your own. Table 2-1 lists some of the gardening alternatives.

Table 2-1 Manual Alternatives to Power Tools	
<i>Powered</i>	<i>Alternative</i>
Electric or petrol lawn mower	Push reel mower
Electric lawn edger	Foot-powered lawn edger
Electric whipper-snipper	Long-neck grass shears
Electric or petrol chainsaw	Manual pocket chainsaw or hand saw
Electric or petrol leaf blower	Garden rake or yard broom
Electric drill	Rechargeable battery drill or hand drills

Buying Energy-Efficient Appliances

Throughout this book I encourage you to equip your home in a way that reduces your reliance on electrical appliances. But when you do need to buy an electrical appliance or two, why not make them energy-efficient appliances?



You can substantially reduce your electrical energy use at home by ensuring that your appliances are energy efficient. You don't need to work out the energy efficiency for most appliances, though — the Australian Appliance Energy Rating Scheme (ERS) does it for you

(<http://search.energyrating.gov.au>). Appliances that currently carry the ERS label are refrigerators and freezers, air-conditioners, clothes dryers, washing machines and dishwashers.

You should determine the size or capacity and the features of the appliance you need and then compare the efficiency ratings of the appropriate models for each of the brand names listed.

In Chapter 1, I explain how the ERS label system works, and what it means. In this chapter, I provide information about the manufacturers that make appliances with high ERS scores. A six out of six is the best an appliance can rate.

I also include the country of manufacture because importing appliances from overseas adds to transport energy costs, which are not included in the rating system. Adding a few ticks for those appliances made in Australia is definitely worth the effort.

Refrigerators

The manufacturers of refrigerators listed in Table 2-2 make some of the most energy-efficient brands on the market.

Table 2-2 Energy-Efficient Refrigerators			
<i>Brand</i>	<i>Made</i>	<i>Web Address</i>	<i>Best ERS Score</i>
Liebherr	Germany	www.andico.com.au	6
Miele	Germany	www.miele.com.au	6
Fisher and Paykel	Australia	www.fisherpaykel.com.au	6
Conia	China	www.conia.com.au	5.5
Westing-house	Australia	www.westinghouse.com.au	5
Electrolux	Australia	www.electrolux.com.au	5
Smeg	Slovenia	www.omegasmeg.com.au	5
Vestfrost	Denmark	www.vestfrost.com	5
LG	China	http://au.lge.com	5

Source: www.energyrating.gov.au



Combined refrigerators and freezers don't score a high energy-efficiency rating. This rating is because large freezers can churn up a large amount of electrical energy. And don't forget that refrigerators are a major source of ozone-depleting gases (refer to Chapter 1 for more information). Electrolux, Liebherr, Miele and Vestfrost sell greenfreeze fridges in other parts of the world (refer to the 'How nasty is your fridge?' sidebar for more about greenfreeze) and may start stocking them in Australia if demand increases for them. Check the companies' Web sites for further information.

Dishwashers

Clearly, the most energy-efficient dishwasher is you. The next most energy-efficient dishwasher available in Australia rates a four (see Table 2-3), which is well short of the maximum of six

that other appliances not available here achieve. Of the Australian-manufactured dishwashers, the Electrolux and Dishlex brands, the best models only carry ratings of 3.5.



Dishwashers also carry the water-efficiency rating label, which you should also take into account when buying a dishwasher. To find out more about water ratings, refer to *Water-Saving Tips For Dummies* (Wiley Publishing Australia Pty Ltd).

Table 2-3 Energy-Efficient Dishwashers			
<i>Brand</i>	<i>Made</i>	<i>Web Address</i>	<i>Best ERS Score</i>
ASKO	Sweden	www.asko.com.au	4
Bosch	Germany	www.bosch.com.au	4
Brandt	France	www.kleenmaid.com.au	4
De Dietrich	France	www.kleenmaid.com.au	4
Kleenmaid	France	www.kleenmaid.com.au	4
Siemens	Germany	www.siemens-homeappliances.com	4
Electrolux	Australia	www.electrolux.com.au	3.5
Dishlex	Australia	www.dishlex.com.au	3.5

Source: www.energyrating.gov.au

Air-conditioners

Two types of ratings apply to air-conditioners:

- ✓ A blue band of stars rating units that cool.
- ✓ A double set of stars for reverse-cycle air-conditioners that can switch between heating and cooling.



When the air-conditioner is used for heating as part of its reverse-cycle function, the heating cycle usually carries a lower energy-efficient rating. Reverse-cycle air-conditioners may not be the most efficient form of heating.

The Appliance Energy Rating Scheme Web site, at www.energyrating.gov.au/acl.html, also helps you determine the size of air-conditioner you need. This calculation is important because an air-conditioner larger than necessary wastes energy every time you switch it on.



You can install an air-conditioner directly in the wall of the room it is to cool, or away from the living area with ducts to carry the air to and from the rooms to be cooled. Calculating the efficiency of the two systems is complex because it involves the efficiency of the actual unit, and its effectiveness in cooling the house. Seek expert advice and get a second opinion.

Newer air-conditioning units use an inverter to alter the amount of power consumed at different settings. Although these units are generally less efficient when run at full bore, they save electricity if run at lower settings.

No Australian-made air-conditioners make the high ratings shown in Table 2-4. Also, note that most air-conditioners are made in South-East Asia.

Table 2-4 Energy-Efficient Air-Conditioners			
<i>Brand</i>	<i>Made</i>	<i>Web Address</i>	<i>Best ERS Score</i>
Daikin	Thailand	www.daikin.com.au	6
Fujitsu	China	www.fujitsugeneral.com.au	6
Sanyo	China	www.sanyo.com.au	5.5
Electrolux	China	www.electrolux.com.au	5.5
Mitsubishi	Thailand	www.mhi.net.au	5.5
Carrier	China	http://carrieraircon.com.au	5.5
Midea	China	http://global.midea.com.cn	5.5
Panasonic	Malaysia	www.panasonic.com.au	5
Airwell	China	www.airwell.com.au	5
Dimplex	China	www.dimplex-australia.com	5
Tecoair	China	www.teco.com.au	5
TCL	China	www.castel.com.au/tcl	5

Source: www.energyrating.gov.au

Washing machines

No washing machine currently on the market gains a six out of six rating. In fact, only one reaches five, as shown in Table 2-5. Note that the following ratings are based on a warm wash — you're likely to achieve even better energy savings if you wash your clothes in cold water. Also note that all the energy-efficient machines are front loaders — the highest rating that a top-loading non-drum washing machine (Fisher and Paykel) can garner is three and a half, with most rating under this.

By the way, the Australian-manufactured machines rate quite low. Fisher and Paykel produce a front-loader that rates the highest.

Table 2-5 Energy-Efficient Front-Loading Washing Machines

<i>Brand</i>	<i>Made</i>	<i>Web Address</i>	<i>Best ERS Score</i>
Kleenmaid	Slovenia	www.kleenmaid.com.au	5
Omega	Slovenia	www.omegasmeg.com.au	4.5
Ariston	Italy	www.aristonchannel.com	4.5
Miele	Germany	www.miele.com.au	4.5
Asko	Sweden	www.asko.com.au	4.5
AEG	Germany	www.andico.com.au	4.5
Westinghouse	South Korea	www.westinghouse.com.au	4.5
Bosch	Germany	www.bosch.com.au	4.5
LG	South Korea	au.lge.com	4.5

Source: www.energyrating.gov.au

Clothes dryers

Compared to other appliances, clothes dryers struggle when it comes to energy efficiency. The highest rating any machine can get is three and a half out of six. The highest raters have autosensor timing functions, thereby reducing the amount of energy expended when the clothes are actually dry. All the manufacturers listed in Table 2-6 make an autosensing model. The most efficient models condense the water rather than blowing it out into the room (vented).

Table 2-6 Energy-Efficient Clothes Dryers			
<i>Brand</i>	<i>Made</i>	<i>Web Address</i>	<i>Best ERS Score</i>
Miele	Germany	www.miele.com.au	3.5
LG	South Korea	http://au.lge.com	3.5
LG	South Korea	http://au.lge.com	3
Indesit	Italy	www.aristonchannel.com	3
Kleenmaid	Slovenia	www.kleenmaid.com.au	3

Source: www.energyrating.gov.au

Entertainment systems

Although entertainment systems aren't covered by energy-rating labels, you can buy Energy Star products to ensure you're at least saving energy when you're not using each respective unit (see Chapter 1 for a more detailed explanation).



Energy Star Australia (www.energystar.gov.au) provides a list of TV and entertainment system brands that are Energy Star partners. These appliances are about 25 per cent more energy efficient than those that aren't rated. Most of the big name electronics manufacturers are listed.

Energy Star Australia also recommends buying these products at retailers who support the Energy Star brand. These include Retravisión (www.retravisión.com.au) and Harvey Norman (www.harveynorman.com.au).

The best ovens?

Chapter 3

The Energy-Efficient Workplace

In This Chapter

- ▶ Implementing energy-saving practices at work
 - ▶ Telecommuting: The virtual desk
-

Imagine arriving at work, relaxed after a stroll from the railway station, opening a window to let in fresh air and sunshine, then sitting down in the naturally lit room, surrounded by oxygen-breathing plants, for your first meeting. If that doesn't sound like your regular start to the day, you're not alone, but you can take heart that eco-friendly office buildings are now hot property, so to speak, and more and more office buildings are being renovated or constructed to be eco-friendly.

Your work environment is important for your health, and an important component of your *ecological footprint* — the impact you have on the planet. According to the Australian Bureau of Statistics, more than 30 per cent of employees work longer than 50 hours a week. That statistic means millions of people spend close to half their 24/7 getting ready for work, going to work, working, then getting home again. Because you spend so much time on the job, thinking about how sustainable your workplace can be is a most worthwhile exercise.

You may feel that you don't have much control over the way your workplace is run, but in this chapter I discuss ways that you can make a difference. First of all, I focus on the environmental problems in the workplace and their solutions, then I show you some ways that you can engage your company

to implement changes. I also look at working from home as a telecommuter — by setting up a home office and persuading your company to allow you to work remotely.

The Energy-Efficient Office Building

The challenges of using energy more efficiently at work are similar to those at home, as I discuss in Chapter 1. Of course, you probably have more influence over how your home is renovated and run than you do at your workplace. Later in this section, I outline how to audit the energy consumption and waste in your workplace, so that you can raise any concerns with your colleagues or managers.

Identifying problematic buildings

You may consider going to work every day a real drain. Well, that feeling is nothing compared to the resources and energy that your workplace may be draining from the planet. Consider these facts:

- ✓ Almost 9 per cent of all Australian greenhouse gas emissions are produced by the commercial property sector. This sector's rate of greenhouse gas emissions is growing faster than any other.
- ✓ Cooling, ventilation and heating systems contribute to the majority of greenhouse gas emissions generated by offices, largely because poor design results in the overuse of air-conditioning.

- ✓ Office buildings have an insatiable appetite for electricity. The main culprits are air-conditioning, lighting, computers, printers and photocopiers. Many companies leave electrical equipment (especially lights) switched on 24-hours-a-day, seven-days-a-week. If you don't believe me, take a look at a city skyline at night!
- ✓ Offices waste paper. Even though many offices use recycled paper, large amounts of paper waste still go to landfill sites (or into incinerators).
- ✓ Most furniture and fittings in offices are made from synthetic materials — chairs, computers, desks, carpets — which poison the air with invisible vapours also called *volatile organic compounds* (VOCs). (VOCs are readily absorbed through the skin, lungs and stomach and can lead to dizziness, nausea and general sickness.)
- ✓ Computers and other IT equipment contain many heavy metals and other toxins. Regularly upgrading this equipment creates a remarkable mountain of IT waste.
- ✓ Traffic congestion, which increases the amount of greenhouse gases and particulates emitted into the air because you spend more time in your car than normal, is at its worst during *peak hour* — the time when most people are trying to get to office buildings (or home again).

The good news is that not all offices are bad for your health and the environment. Eco-aware architects and developers have designed stunning energy-efficient workplaces and office buildings that deal with many of these problems.

Designing for energy efficiency

The classic glass-skinned office block, with central lift wells and ventilation shafts, and windows that don't open, dominates most city skylines. These buildings are the most difficult to make energy efficient, and are gradually being replaced by new or refurbished office buildings.

Sustainable design standards, now in force across Australia, apply to the construction or refurbishment of all office buildings. These standards ensure that new buildings are energy efficient and improve the overall sustainability of the commercial property.

One hurdle that property developers face when constructing new buildings is sourcing sustainable building materials. Steel and concrete have high levels of 'hidden' or *embodied energy*, which means that these products would ordinarily emit high levels of damaging emissions during processing and consume a large amount of fossil fuel for production and transport purposes. One way property developers can reduce the environmental impact of these materials is to design and construct high-quality buildings that can last a long time.

Another aspect of building or refurbishing an office block is the internal design. The latest standards strive to ensure that office buildings

- ✔ Use recycled products and materials that have low levels of embodied energy such as wool insulation — instead of fiberglass batts, which require more energy to produce.
- ✔ Capture natural light to reduce the need for strong artificial lighting.
- ✔ Employ good ventilation, insulation and shading to allow air-conditioning to operate only when the weather is extreme and the building is fully occupied.

- ✓ Utilise renewable sources of energy, such as solar power, generated by the building itself, as well as sourced from the power grid.
- ✓ Use energy-efficient appliances and equipment.

These types of design elements made Lend Lease's The Bond building in Hickson Road, Sydney (completed in 2004), the first five-star-rated (under the Australian Building Greenhouse Rating Scheme — see www.abgr.com.au) building in Australia. The five-star design features of The Bond building include

- ✓ An innovative manual shading system that protects offices from the afternoon summer sun but captures the warmth of the winter sun.
- ✓ Naturally ventilated and lit sunrooms that reduce the electricity consumed by air-conditioning and lighting, and make the rooms pleasant environments to work in.
- ✓ External, covered terraces, which can be used for meetings and social occasions in all but extreme weather.
- ✓ Chilled water running through beams in the ceiling, which carry away the heat generated within the office. This feature greatly reduces the artificial cooling and heating required.
- ✓ A roof-top garden with a rainwater irrigation system. This feature provides a pleasant outdoor environment and helps reduce unwanted heat from the sun.



Energising your workplace

You may have no direct control over the design and management of the building in which you work. So how on earth can you make it more energy efficient?

Armed with a checklist, you can pick up whether a building is energy efficient (within the limits of its design). And by taking this checklist to your office or building manager to discuss where you think energy is being wasted, you may end up saving your company a heap of money on energy bills.

Don't be afraid to present your checklist to one of your managers. Companies are willing to address these types of issues because they know that by doing so, they achieve savings in energy costs as well as greater productivity from their staff.

You can develop your own checklist by starting with the following questions:

Are the air-conditioners, lights and electrical office equipment on when the first person gets to work? (If you're the first to work one day, you can answer this question yourself!) If so, the chances are good that everything has been left on all night.

Are the electrical appliances in the kitchen or production areas rated highly for energy efficiency?

Are the computers, printers and photocopiers Energy Star- equipped? (Refer to Chapter 1 for more about the Energy Star rating system.)

Are the windows covered with blinds or curtains or outdoor shades and, if so, do they have much effect on the temperature or the amount of light in the office?

Is anyone using an electric fan to better circulate air in their part of the office? If so, the air-conditioning is faulty and wasting energy.

Are employees regularly ill? If so, the building's air circulation may be poor.

If you need help in persuading your office managers, download information about energy-efficient buildings from the Web (for example, www.abgr.com.au) or show them this chapter.

Refurbishing an old building for energy efficiency

Retrofitting old buildings to become energy efficient is a growth industry. Many companies care about energy consumption because managers, staff and shareholders are concerned about climate change, and because saving energy also saves the company money.



Managers or owners of office buildings can achieve a high energy-efficiency rating by doing the following:

- ✓ Outfitting the office with highly-rated, energy-efficient appliances and Energy Smart computers and audio-visual equipment (refer to Chapter 2 for more about energy-efficient appliances and computers).
- ✓ Ensuring that the building's air-conditioning system is regularly maintained and has timers fitted, so that the air-con is used only when people are in the office.
- ✓ Installing water-saving taps and showerheads in the kitchens and bathrooms, as well as dual-flush toilets in the bathrooms.

- ✓ Installing sensors that turn on lights only when people are in the office.
- ✓ Changing the fluorescent lighting to a more modern energy-saving type of globe. For example, T-12 lamps are less efficient than the smaller T-8 and even T-5 lamps.
- ✓ Installing bike parking and showering facilities to encourage staff to cycle and walk to work. (See Chapter 4 for more tips about leaving the car at home.)
- ✓ Installing screens and shutters on windows to block out direct sun during summer and let sunlight in during winter — this measure enables the air-conditioning to operate effectively at a lower setting.
- ✓ Investing in furniture and fittings made from materials with low embodied energy such as natural or recycled materials, and painting the office with non-toxic paints.



The Melbourne Central Tower in Elizabeth Street, Melbourne, is a shining example of applied thinking to save energy and money. Originally built in 1991, the Central Tower is a 52-storeyed building that was rated two stars by the Australian Building Greenhouse Rating Scheme (ABGRS). The ABGRS rates each building on its energy efficiency and greenhouse gas emissions. To find out more, check the organisation's Web site at www.abgr.com.au.

As it turned out, though, the building was originally designed to achieve a much higher rating, but wasn't being run to take advantage of its design features. An investigation showed that the air-conditioning was running 24 hours a day and, during summer, was permanently set to cope with outside temperatures of 40 degrees Celsius. Addressing this simple

management oversight resulted in an instant upgrade to a three-star rating and massive savings in energy consumption and the tenant's energy bill.



The Australian Energy Performance Contracting Association (AEPCA) represents a growing number of contractors who perform energy-efficient audits on buildings, and can advise companies how to improve their energy performance. For a list of contractors and government agencies who perform these audits, visit www.aepca.asn.au.

Telecommuting Instead of Polluting

Do you hate the daily commute in traffic but don't want to give up that well-paid job? Maybe your workplace offers telecommuting?

Telecommuting is working from home via a connection to the office computer network using the Internet or some other system. This reduces the need to 'commute' or travel to work. (Telecommuting is also called *teleworking*.) Companies usually prefer employees to telecommute on a part-time basis; that way, employees still work in the office at least one or two days a week.

Telecommuting ups

Here are reasons why employers like telecommuting and allow some employees to work from home:

- ✓ **Reduced costs:** An employer can reduce the number of desks, the size of the office, the amount of stationery, and the amount of parking required if a number of staff telecommute several days a week.
- ✓ **Increased productivity:** Employees working at home can concentrate on a specific task rather than answer phone calls and get distracted by other staff at the workplace.
- ✓ **The feel-good factor:** Telecommuting can build trust between management and staff. By offering staff a choice and allowing them to work unsupervised, companies can earn the loyalty of their employees. In some cases, telecommuting forms an attractive part of a salary package.

Employees take to telecommuting for a range of reasons, too:

- ✓ **Less travelling:** Telecommuting eliminates travelling time; you don't have to commute to the office. If you normally travel to work by car, telecommuting enables you to help reduce greenhouse gas emissions.
- ✓ **Telecommuting is family-friendly:** Families gain more time to spend together. Even though you have to concentrate when working from home, you can still interact with your family — in the same way you interact socially with your colleagues at the office.
- ✓ **Homes are pleasant environments:** You probably enjoy being at home more than work. Your home is set out just the way you like it.
- ✓ **Flexibility:** Employees who need to spend time at home, for example, to care for family members, can do so without giving up work.

Telecommuting is great for the environment because it reduces the number of peak-hour travellers, and can contribute to easing some of the peak-hour traffic congestion and air pollution produced by cars.

At the community level, telecommuting allows people with specific family commitments or individual needs to still access work opportunities. For example, primary caregivers of children and other family members, as well as the physically disabled, can participate more effectively within the workforce. People working from home also spend more money in their community, creating stronger local commerce and diversifying the economy in the region.



As a one-off policy initiative, telecommuting hasn't yet substantially reduced travel or car trips. Telecommuting needs to be implemented as part of a package of measures to encourage increased public transport, plus walking and cycling, to have this effect. For example, workplace travel plans for employees can include not only telecommuting agreements, but also financial incentives to use public transport, car share and other methods to reduce the amount of people driving cars to work. (For more information about workplace travel plans, see Chapter 4.)

If the shoe fits . . .

Some jobs and some people are simply not suited to telecommuting. Many jobs require face-to-face contact, and some people don't have the discipline and personality to be as productive at home as they would be in a supervised office.

Telecommuting works only if it suits the job, the employee and the organisation, and if all the practical issues are carefully planned. As a result, the proportion of the workforce that can telecommute is lower than many people would hope.

The most suitable candidates for telecommuting are those employees who produce self-contained pieces of work — for example, project work, policy analysis, research, planning, editing and writing.

Setting up a telecommuting office

To telecommute, you need a practical work area. Better yet, set up an energy-efficient home office. Here are some guidelines:

- ✓ **Computing equipment:** Although not essential in some jobs, working from home is much easier when your computer is set up to access files and documents on the company's network, exactly the same way you do when you're at work. For example, get a high-speed Internet connection and run the same office software at home. You may need someone from your company's IT department to set up your computer to do this. If you can't take your computer to work, an IT person may need to visit your home. And, as with any electrical equipment you have at home, to save energy turn it off when you're finished and then turn the power point off at the wall.
- ✓ **Workspace:** You need to be able to effectively separate your home and work life. A room, dedicated to work, with a desk, an ergonomic non-VOC chair, good natural lighting, no outside distractions and space for office equipment (such as a phone, fax and scanner) are the minimum requirements.

Chapter 4

Wheels, Pedals and Heels: Getting Around

In This Chapter

- ▶ Using other forms of transport to get around
 - ▶ Shopping online — instead of driving to the store
 - ▶ Designing the ‘green’ car of the future
-

When I was growing up, my friends and I dreamed of the day we would own our first cars — to give us the independence we yearned for. Looking back, not too many of my friends grew up craving to catch the bus or train, or planned to upgrade their push bikes. At the time, neither did I.

Cars can provide independence for some and status for others, and they continue to influence the style and development of our urban areas as we chase the dream to live in a large house with plenty of space. Cars give people the freedom to live in nice homes in new suburbs, far from jobs, shops, schools, friends — even family.

Unfortunately, urban sprawl and high car use go hand in hand. Cities and large towns have evolved into large, poorly serviced urban areas because people can travel far and wide in their cars. But high levels of car use have become synonymous with other unsustainable and energy-consuming characteristics: Air pollution, traffic jams, road accidents, reduced health and fitness, and poor public transport access.

So what gives? Can you maintain your travelling freedom by owning and using a car, and do something about saving energy? The answer is yes, if you're willing to balance your car use with other forms of transport. This chapter shows you how, by looking at the impact cars have on the environment, and explains some of the more energy-efficient transport options that you can use to get through your day.

Sidestepping the Energy Crisis

Fewer cars on the road would lower the pressure that exists on mining for and using fossil fuels, not to mention the substantial reduction in greenhouse gas emissions that would result. Some commentators argue that fossil fuel reserves have already peaked and the world is now into the second half of using the remaining stores.

Oil and gas, like most things that are mined or harvested from the earth, are finite resources that need to be managed much more effectively before they run out.

Most of this oil and gas is used for transport, so commonsense says that if you can cut back on your car travel time, you're going to use less oil and gasoline, and play a part in decreasing the pressure on ever-dwindling resources.

Alternative fuel cars are one option (but these are currently expensive to buy) and converting fuel tanks over in standard vehicles is another (see the section 'Looking at the "Green" Car Evolution' later in this chapter). However, neither option is the most energy-efficient approach. Instead, throttling your addiction to your car use and choosing more energy-saving transport choices is the way to go.

Sustainable Transport Options

In the preceding section, I explain why a continued high level of car use is unsustainable. However, walking and cycling, which require only the energy your legs can exert, are very sustainable. But what about public transport? Buses and ferries run on diesel — why are they more energy efficient? And trains and trams use a lot of electrical energy — what makes them so sustainable?

The answer is all in the numbers. For example, buses and trains fit many more people in the one vehicle or carriage than cars do. Cars can take only up to four or five people, although they regularly carry only one or two. By comparison, buses take approximately 60 passengers and a train carriage can fit close to 200 passengers (an average eight-car Sydney train can carry up to 1,600 people).

Working out that 60 pollution-emitting cars are going to have a greater impact on the environment than one bus carrying 60 passengers, not to mention the comparative benefits of a 1,600-person train, isn't difficult. Also, queuing for traffic lights half the morning and evening is a waste of time and money — if you travel more often in buses, trains, ferries and trams, you avoid (and help ease) traffic congestion.

Now for the crux of the matter: You may agree that it would be nice to reduce your car use, but you can't realistically see your way clear to changing your travelling habits. You don't have to go the whole hog. Switching to more sustainable options for some trips may be easier than you think.

Getting to work less stressy

The most obvious trip that can be converted from car to other forms of transport is the journey-to-work trip. If you don't need a car as part of your job, look into changing to public transport. And if you work regular hours, you're travelling at a time of day (the morning and afternoon peak-hour periods) when public transport runs regularly and efficiently.

If your office or workplace provides showering and changing facilities, walking or cycling to work is much more appealing (and less smelly) than walking and cycling the same distance for other errands. If your workplace currently doesn't have any showering facilities, what would be the harm in asking whether it would be possible to add them? In fact, showering and change facilities are becoming compulsory in new developments in many urban areas across Australia.

If you change your travel-to-work habits, you do something positive not only for the environment, but also for your peace of mind. How many times have you spent an inordinate amount of time in peak-hour traffic and got to work feeling wrung out? Compare your experience with someone who catches the train and has a chance to read the morning paper while listening to some soothing music on an MP3 player, and who arrives at work ready, willing and able. (This same person probably squeezes in a snooze as part of the journey home, or opens a laptop or a good book.)

The relative cost savings to your wallet are also substantial. A non-car user who combines public transport and taxis over the year, with the odd hire car thrown in, is likely to incur fewer costs than those who buy and operate a car, and pay the substantial registration, insurance, fuel and maintenance costs.



Some companies even offer subsidised public transport travel or provide company Cabcharge dockets if you give up your car parking space (or turn down a company car offer). If your employer doesn't, try lobbying the personnel department for these things. For more details, see 'Workplace travel plans' later in this chapter.

These legs were made for walking (and pedalling)

The reality is that many people live too far from their work to walk all the way. Or do they? The trend in many cities around the world is that more people are living closer to their workplaces and social attractions, and they walk to work via the many shops and services in their urban areas.

Even if the walk to work is too far, walking to a nearby train or bus stop and then catching the service the rest of the way is much healthier and less expensive than driving.

Cycling is also becoming an increasingly popular transport option, mainly because many cities and towns are investing in good, safe and direct cycling paths that don't compete with other traffic. In some cases, using a bicycle to get to work may be quicker than dealing with traffic congestion.



The key to cycling to and from work is planning and being prepared. The following checklist can help you get underway:

- ✓ **Stowing your bike:** Make sure your workplace has good bike parking and locker facilities. This provides you with peace of mind that no-one is going to cycle off with your treasured transport investment.
- ✓ **Freshening up:** Ask about accessible showering and change facilities at your workplace. (As I mentioned in the preceding section, including these services in new commercial buildings is becoming compulsory in many Australian urban centres.)
- ✓ **Researching the route to work:** Look for roads or paths that are well surfaced and wide enough to avoid conflicts with other vehicles. (Okay, admittedly flat is easier than hilly as well.)
- ✓ **Investing in the right gear:** You need to be safe — and comfortable. Make sure your bike is in top shape, buy a well-fitting helmet and small backpack, and get some reflective and protective gear, and lights for after twilight. Don't forget to carry water and a kit to fix a flat tyre.

If you work flexible hours, you can even ride your bike part of the way to a train station, then take your bike along for the ride. Make sure your travel times avoid peak services, though; public transport authorities allow bikes to accompany commuters, but your bike must not obstruct the way for other passengers. In some states, you can travel with a bike any time you want, but you need to buy an additional ticket for your bike in peak periods. Check with your local rail agency for further information.



In some regions, such as the Australian Capital Territory and some cities in the United States, you can take your bike with you on your local bus. These public buses have bike racks on the front so bikes get carried safely out of the way of passengers.

Going public

People cite various reasons for refusing to use public transport; others give just as many reasons why they love it. Those against trains and buses, in particular, refer to safety and security concerns, unreliable services or lack of options near where they live. Those for public transport usually say they feel more relaxed after the trip, and talk about the relative low costs and the support they receive from the public transport system.

Yet another group isn't exactly sure how to use public transport. These people grew up not using buses or trains, and find getting started a bit daunting. Never fear: In the age of the Internet, going public is much easier than you think.

Most public transport providers in cities and towns offer excellent Web sites that can help you plan your journey. You can find timetable information, maps to show you each route, fare information, ticketing options and destination information.

Some of the Web sites run by larger transport agencies can provide you with a trip planner that tells you what to do after you leave your home. On these sites, you simply enter your home address, the address of your destination and the time you want to leave. You're then provided with the quickest transport options, route information, what bus stops or train stations to get off at, and even walking routes and distances to your

selected destination. See Table 4-1 to check out the public transport services and schedules available in your state.

Table 4-1 Public Transport, State by State

State	Type	Web Address
NSW	CityRail	www.cityrail.nsw.gov.au
	SydneyBuses	www.sydneybuses.nsw.gov.au
	NSW Transport Info	www.131500.com.au
Queensland	Queensland Transport Info	www.transinfo.qld.gov.au
South Australia	Adelaide Metro	www.adelaidemetro.com.au
Tasmania	Metro Tasmania	www.metrotas.com.au
Victoria	Trains, Trams and Buses	www.metlinkmelbourne.com.au
	Victoria Transport Info	www.viclink.com.au
Western Australia	Transperth	www.transperth.wa.gov.au



If you're a public transport novice and find a service that you'd like to try, develop a timetable for yourself that reminds you how much time you need to get up in the morning to walk to your bus stop or train station in time for your service. Prepare a similar plan for the way home.



When you start using public transport, you find that many interesting people are along for the ride — in large numbers at some key peak periods of the day — and in most cases the term safety in numbers rings true when you're travelling with many other commuters. The comfort and ease that you eventually experience getting to and from work this way may even encourage you to use public transport at other times: Before long you may find yourself hopping on a bus or train on the weekend because you know you're going to get to your destination more cheaply, with fewer traffic hassles and parking problems.

Car sharing

If public transport is out of your reach, or isn't practical for you, you can still make an energy-saving difference to the way you travel: Try car sharing or ride sharing. Although car sharing isn't yet big in Australia, it is very popular in the United States and in some European cities that limit car access but don't have quality public transport alternatives. The great thing about *car sharing* and *ride sharing* (also called *car pooling*) is that it reduces the number of single-vehicle trips on the road, therefore cutting back the number of cars on the road and the energy used.

You can ride share with workmates, or sign up to share a car with local residents — to use socially and on the weekends. Here's how the two different models work:

- ✓ **A group of employees regularly share a ride to and from work:** The car used each day is provided by the person whose turn it is to drive. Car sharing companies such as Go Get (visit www.goget.com.au) can assist

companies to organise ride-sharing groups based on where people live and what time they wish to arrive and leave from work. In some cases, workplaces actually donate the car to the group for sharing the ride to work.

- ✓ **A group of residents share a centrally located car:** This model is a sort of communal car system. A company, such as Go Get, provides several cars in centrally located residential areas that people can book to use by the hour for a very reasonable price. This is a little bit like a hire-car system, except you have to share the car only with the small number of residents that live near you, which means that the car is more than likely to be available at the times you request it.



The TravelSmart Web site at www.travelsmart.gov.au (see the sidebar 'Get travel smart' for more details) provides information about government-sponsored community transport initiatives, including a links page that lists car-sharing Web sites.

Workplace travel plans

If you want to use public transport, it helps if you live near a reliable and direct public transport service, and that your workplace is located near one as well. Even better, your company may also offer workplace travel plans to subsidise your new energy-saving transport choices, and make it easier for you to leave your car at home.

Get travel smart

TravelSmart Australia (see the Web site at www.travelsmart.gov.au) encourages communities and workplaces to think more about their travel choices. Funded by the Commonwealth, state and territory governments, the community-based TravelSmart program sets up site offices in suburbs and shows people how to make voluntary changes to their travel choices. Everyone is encouraged to use other more sustainable ways of getting around, rather than driving alone in a car.

The TravelSmart project seems to be working, because after the visit, more people in a community use buses, trains and ferries when they're shown a better route, get timetable information or are given financial incentives. This means that existing transport systems are more likely to be better used. TravelSmart programs also help coordinate car-pooling programs and encourage families to share car trips and to replace their short car journeys with walking and cycling.

Fortunately, many employers are becoming more interested in offering their employees subsidised public transport fares and passes, and other sustainable transport incentives. This approach is cheaper for the company, as well as for the employees who choose public transport over driving cars to work each day. Many companies are burdened by employees expecting cars in their salary packages. And all that floor space allocated for car parking can be used for more productive purposes.

The types of workplace travel plans that companies provide may include

- ✓ Public transport fare subsidies and passes.
- ✓ Personalised travel information and marketing material.
- ✓ Better bus stop facilities at the workplace.
- ✓ Carpark space allocation that favours car sharers.

- ✓ Flexitime and teleworking arrangements.
- ✓ Local area cycling and walking route information.
- ✓ Car share mileage clubs rewarding those with reduced car use.
- ✓ A pool of bikes that employees can use to cycle to and from work.
- ✓ Low emission vehicles for staff.
- ✓ Public transport service announcements and other real-time information.
- ✓ Public transport, walking and cycling events (such as breakfasts, lunches, seminars and so on).
- ✓ Timetables and links to interactive trip planners.



If your company doesn't yet offer a workplace travel plan, ask some of your colleagues if they're interested in joining you to lobby for one. When you gather some support, go to your manager with a report or some Internet material that outlines the benefits for the company if it develops a travel plan. Hey, you can even take along a copy of this book and show your boss this chapter!

Provide your company with information that promotes the positive benefits of developing a workplace travel plan. The following outcomes are likely to be music to most employers' ears:

- ✓ Fosters improved relationships between staff and management

- ✓ Helps retain and attract staff
- ✓ Gives the company a better image in the community
- ✓ Saves money — subsidising public transport is cheaper than providing employees with cars or car parking

Shopping from Home

Nothing on the Internet has made as big an impact on transport as the ability to shop online. For example, if you make most shopping trips in your car — to buy groceries, hardware items and things that can fit in your car boot — you can avoid the hassle of finding a car space in a humungous shopping centre. Instead, you simply park yourself in front of your computer and use the Internet to buy the things that you don't need to see, touch or try on.



Here are some online shopping categories that can help you reduce your individual car trips:

- ✓ **Books, music, DVDs, electronics and more:** Many retailers, such as Angus & Robertson (www.angusandroberston.com.au) and Sanity (www.sanity.com.au), operate Web sites for shoppers who know exactly what they want. Rather than drive to the store, you visit the company's Web site and search the vast online catalogue. The best part about shopping this way is that you're more likely to find what you're after: You get a better selection online compared to at the nearest shop.

- ✓ **Perishable foods:** Large supermarkets, such as Woolworths (www.homeshop.com.au) and Coles (www.coles.com.au), and specialist organic food stores, offer online shopping and home delivery to Internet-savvy shoppers who have set shopping lists and don't need to visit the store to see what they're buying.
- ✓ **Fine dining, delivered to your door:** Instead of driving to a restaurant and struggling to find a parking space, why not get a gourmet meal delivered? Many good restaurants in cities and large regional areas run Web sites and allow you to order online. Other companies, such as Cuisine Courier (www.cuisinecourier.com.au), allow you to select from the tasty and culturally varied menus of many well-known local restaurants.
- ✓ **Furniture and appliances:** Most national retailers in this category have glossy online catalogues that encourage you to order and have your big, bulky purchase delivered to your door without your having to lift a finger. Saves you from driving to the store as well, right? (Google a retailer to locate a catalogue.)
- ✓ **Specialty products and services:** The Internet gives you access to products and services that may not be in your area at all. You can use a search engine such as Google (www.google.com.au) to find products then purchase what you want without driving for miles (or standing in queues). For example, you can compare competing contents insurance policies, purchase a holiday or track down a great 'green' cleaning product sold by a small business in another state.
- ✓ **Auctions and secondhand resellers:** Sites such as eBay (www.eBay.com.au) and other places where you can buy or sell pre-loved goods basically enable you to trade with each other no matter where you are geographically.

These sites are famous for broadening shoppers' horizons beyond local newspapers and having to trade with local secondhand stores or pawnbrokers.

Some commentators worry about an increase in online shopping, especially the negative impacts it could have on the economic and social sustainability of our urban centres and towns. For example, small businesses in town and suburban centres may suffer if consumers buy more products from national online retailers.

Similarly, the amount of commercial deliveries made by planes, trains and couriers may increase as online shopping becomes more popular, although this impact is offset by the fewer individual car trips people make to shopping centres to purchase and pick up goods.

Checking out virtually

Most retailers run interactive Web sites that provide picturesque catalogues of their goods and services that you can browse through to your heart's content. As you scroll through the catalogue, you can place products in the virtual shopping cart, where they're stored until you proceed to the virtual checkout.

The virtual checkout steps you through several pages that total the products you select along with additional taxes and the delivery costs to give you an invoice total. These pages are usually encrypted so that your personal information and payment details are secure: To confirm this procedure, make sure a little padlock appears at the bottom of your browser's window.

To progress through the checkout, you need to provide your personal details and a shipping address, and then select a shipping method. At this point you can usually click on a button to choose Australia Post (the cheapest method), unless you're buying perishable goods or a bulky item.

You then reach the payment pages and add your credit card details to pay for your purchase. Shortly afterwards you receive an email that confirms the goods you bought, how much they cost and when your purchase is to be delivered.

Some Web sites, especially many run by smaller businesses, don't offer virtual checkouts and provide you with other ways to buy. Instead, you order by email or call the listed telephone number to talk to a real live person. You can then arrange to pay by COD, cheque, money order, credit card or, if you're set up for Internet banking, make a direct deposit into the business's bank account.

Two warnings, though: Don't ever email your credit card details to pay for an order. Emails can be intercepted. And if you use online banking to deposit the money into the business's bank account, double check that you correctly type the recipient's BSB and account number and that you include an invoice number or your name to identify the payment as coming from you.

For more details about shopping online securely, check out *Internet For Dummies*, 2nd Australian Edition (published by Wiley Publishing Australia Pty Ltd).

So far, the impacts of online shopping appear to be minimal. Most town and suburban retail centres continue to survive because of the social role they play: They provide places where people can interact and relax. Many retailers now have two avenues to a thriving business: The traditional shop front (which people visit to physically browse for the things they want), and the Internet (where people log on to find what they're ready to buy).



Many products you're likely to buy from online companies can be delivered by Australia Post, or some other postal service, that already goes past your door, every day. To find out how, see the sidebar 'Checking out virtually'.

Looking at the 'Green' Car Evolution

Buying a new, alternative-fuel car from a large car maker doesn't come cheaply in Australia. Unfortunately, you're likely to have to wait until sales of 'green' cars reach significant volumes before the prices even out. Innovative alternative-energy cars are selling well overseas, which makes hoping that a range of alternative-fuel cars is going to be available at comparable prices in the not-too-distant future realistic.

The two main alternative-fuel vehicles available to Australian motorists right now are hybrids that combine a combustion engine with an electric motor, and LPG vehicles.

Hybrid hysteria

What are these hybrids that everyone is talking about? *Hint:* They're not roses, or a breed of dog.

A hybrid car combines the everyday combustion engine you probably have in your car with an electric engine. The car switches from petrol mode to electric mode when idling or travelling at low speeds to reduce petrol consumption and emissions.

One selling point of the hybrid is that the battery doesn't need to be refuelled via an electrical socket on the wall; instead, you charge the electric battery every time you press the brakes.

Hybrid cars have been available in the United States and Europe for some years now, but have only recently been introduced to the Australian market. The best known of the hybrids are

- ✓ Toyota Prius (<http://prius.toyota.com.au>) — retails at around \$37,000 in Australia.
- ✓ Honda Civic Hybrid (www.honda.com.au) — the main competition to the Prius in Australia and retails for around \$33,000.
- ✓ Lexus brand hybrids (www.lexus.com.au) — the Lexus RX 400h SUV and the Lexus GS450h sedan, which cost you \$90,000 and \$115,000 respectively.

LPG-ready vehicles

Ford and Mitsubishi recently released dedicated *liquid petroleum gas* (LPG) vehicles in Australia. LPG used in cars contains propane and butane and is available at most fuelling stations. Buses and taxis have been running on LPG in Australia for some time now. Some people have also been using LPG in their private vehicles for many years, but these vehicles had to be custom-modified to run on the fuel.

The Ford Falcon ES-SSS is the first LPG-powered car to roll off the mainstream production line. The Ford Web site (www.ford.com.au/landing/egas) describes sedan, wagon and utility models that set you back at least \$38,000.



New LPG cars come fully modified, and these may become more popular now that subsidies are available. The Australian Government began offering rebates for car owners converting to LPG gas at the end of 2006. People buying a new LPG-powered car receive a subsidy of \$1,000; those converting a normal petrol tank to LPG receive \$2,000. This policy initiative occurred during the height of the price hike in petrol costs in October 2006 and the rebates are available for eight years. They apply only to cars used privately. For more information on how to take advantage of this subsidy, check out www.ausindustry.gov.au and click on LPG Vehicle Scheme link.

What the future holds

Taking a look at ‘green’ machines that are available around the world provides a picture of how quickly these new technologies are emerging. One obvious trend is that the major car manufacturers are focusing on liquid fuels in their mainstream releases. Independent newcomers, like Tesla Motors in California, have released innovative electrical cars, but these vehicles are far from mainstream.

In the United States, alternative fuel cars currently on the market include

- ✓ **Daimler Chrysler — four E85 ethanol models:** The Stratus, Sebring and Caravan sedans, and the Durango SUV.
- ✓ **Ford — five alternative fuel models:** One electric/gasoline hybrid and four E85 ethanol-powered cars.

- ✓ **General Motors — six alternative fuel models:** One electric/gasoline hybrid, one CNG-only powered engine; one CNG/gasoline bi-fuel utility; and four E85 ethanol models.
- ✓ **Honda — four alternative fuel models:** A *compressed natural gas* (CNG)-only powered Honda Civic and three electric/gasoline hybrids (a Honda Accord, a Honda Civic and a Honda Insight).

CNG is a fossil fuel that produces fewer harmful emissions than petrol, or gasoline. Unfortunately, global demand is outstripping supply for this energy resource.
- ✓ **Lexus — two electric/gasoline hybrids:** The GS450h sedan and the RX400h.
- ✓ **Nissan — two alternative fuel models:** one hybrid and one E85 ethanol model.
- ✓ **Toyota — two electric/gasoline hybrids:** A Highlander SUV and the Prius.

These types of alternative fuel vehicles are also available in other parts of the world, including Europe and Asia.



Electric vehicles promise to lower greenhouse gas emissions. If the electricity is sourced from a renewable power source, such as wind or solar, you have a form of transport that is almost free of greenhouse emissions. However, if the electricity is generated by burning coal, then greenhouse emissions are still being produced. For more information on the pros and cons of electric vehicles, go to the United Kingdom's Environmental Transport Association Web site at www.eta.co.uk.



Electric cars are also becoming popular in other parts of the world. In London, for example, a great example shows what can be done when innovation and government support come together. GoingGreen (www.goinggreen.co.uk) sells the electric-powered G-Wiz, a 2-door hatchback with a top speed of approximately 60 kilometres an hour, which is considered adequate for London driving conditions and speed limits. It also has a range of up to 60 kilometres before it needs to be recharged.

With government help, recharging ports are set up around London. This makes the vehicle a serious option only for Londoners, but the big attraction is that this vehicle has no radiator, clutch, gears, exhaust, oil filters, spark plugs or many of the parts that wear out. And it produces no emissions.

Holding out for hydrogen

Hydrogen is the cleanest and most energy efficient of the alternative fuels, according to the United States Department of Energy. And, hydrogen is everywhere. Water is just hydrogen and oxygen — H₂O, don't you know?



Hydrogen isn't a source of energy. It must be separated from substances before it can be used as a fuel. And the process of creating hydrogen fuel can consume energy. For hydrogen to power a car, it must be mixed with oxygen in a fuel cell.

Most of the world's major car makers are racing each other to get the first fully fledged hydrogen car on the road. These days,

Chapter 5

Ten Energy-Saving Tips

In This Chapter

- ▶ Turning things off
 - ▶ Switching to 'green' power
 - ▶ Insulating your home
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-

Electrical energy powered by burning coal is the most popular form of energy supplied to homes around the world. Transport also consumes energy obtained from refining another fossil fuel, this time oil. The problem with this method is that burning fossil fuels emits greenhouse forming gases that exacerbate the global climate change problem.

It doesn't have to be this way. Some simple lifestyle changes to address the way you use electricity and cars can greatly reduce your energy consumption. And you now have a better ability to invest in alternative energy sources that produce little or no greenhouse emissions. Here are my top-ten tips for becoming a more energy-efficient person.

Turn It Off

Leaving the lights on in every room in the house when no-one is there or leaving the computer on when you clock off at work

contributes significantly to the electrical energy wastage that occurs in many homes and workplaces. So, the first energy efficiency action you can take is to simply turn it off when you're finished with it.

And when you're in the routine of turning electrical switches on only when you need to, how about starting to turn your power point switches off at the wall before you go to bed. You obviously need to leave the fridge and freezer on, but turning off TVs, stereos, games, computers and other entertainment equipment at the wall instead of leaving them in standby mode can greatly reduce electrical energy consumption.

Switch to 'Green' Power

Most Australian energy supply companies can now purchase your electricity from 100 per cent renewable energy sources such as solar and wind. The more people that pay for this electrical energy alternative, the more companies are going to invest in increasing the amount of alternative energy produced, as well as decreasing the amount obtained from damaging sources like coal. So check your local energy supplier and see what 'green' power options are available. (Chapter 1 covers going 'green'.)

Replace Your Light Globes

The old tungsten light globe has been the most common lighting source for most Australian homes. It just so happens that these lights have been one of the great electrical energy wasters since the light globe was invented. And don't get me

started on those trendy looking halogen down lights that are fitted into most new homes and apartments.

Fluorescent lights can achieve the same brightness using much less electrical energy. And if you live in New South Wales, contact your local council or local energy provider and ask them to replace your old globes with new energy-efficient globes — they do it for free. If not, just pop on down to your local supermarket or hardware store as many of them are now selling the newer fluorescent lights. (Check out Chapter 1 for all about low-energy lighting.)

Choose Star Appliances

You can greatly reduce your electrical energy consumption by ensuring your appliances are rated highly for energy efficiency. The Australian Appliance Energy Rating Scheme (ERS) rates appliances such as refrigerators, freezers, air-conditioners, clothes dryers, washing machines and dishwashers for the amount of electrical energy they use. The highest rank an appliance can achieve is six stars. Avoid those appliances that are only rated one star — they're major electrical energy guzzlers. (Collect your information about energy stars from Chapter 1 and find out all you need to know about energy-efficient appliances in Chapter 2.)

The next step is to pinpoint those appliances around the home that you may be able to use less. For many people, the clothes drier and the dishwasher are two appliances that can be considered a luxury rather than a necessity. You can reduce the use of these appliances by washing some of the dishes by hand or hanging some of your clothes out on a drier, which we all used to do once upon a time.

Last but not least, wash your clothes in cold water — the energy required to heat up your water for a wash is wasted energy when you consider that most household stains can be removed in a cold wash with biodegradable washing powder.

Insulate Your Home

The need for many Australian homes to use artificial heating and cooling appliances isn't just a direct result of the harsh climate. Many Australian homes are designed poorly and have no regard for the local climate, which varies greatly from coast to coast. You can tell that a house is designed inefficiently when you feel warmer inside than outside on a summer's day or you freeze your socks off on a winter's night.

You can reduce your need for constant air conditioning and heating by insulating your home more effectively. Simple insulation methods include shading your windows in summer, letting the sun shine in during winter, installing insulation batts in your walls and ceilings and sealing gaps around all doors and windows. (Chapter 1 covers insulation in the energy-efficient home.)

Cook with Gas

Natural gas is a more energy-efficient fuel source than electricity — you use much less of it to achieve the same result. Although natural gas is another one of those fossil fuels that needs to be consumed moderately so that it doesn't run out, using natural gas to power some of your appliances can help you reduce your electrical energy consumption.

The best use for natural gas is cooking with it on the stove top as an alternative to using the energy-inefficient oven, especially if the oven is electrical. Not only does cooking on a gas stove top use less energy than roasting something inside the oven, it also produces half the greenhouse gases created by electric stove top equivalent. You can also use natural gas to heat your home or power your barbecue. (Check out the wonders of using gas in Chapters 1 and 2.)

Work at Workplace Energy Efficiency

Your ability to be more energy efficient at work is a little harder because you have more control over your home lifestyle than your work environment. But at work you can turn your computer off when you're not using it or turn the lights off in your area if you're the last to leave for the day.

Many workplaces are now jumping on board the energy efficiency bandwagon. If yours hasn't as yet, how about encouraging your manager to consider some very effective energy efficiency measures such as installing light sensors so that lights come on only in a space when people are present, or implementing a paperless office system whereby less printing and photocopying takes place. (Chapter 3 shows you how to become an active member of the energy-efficient workplace.)

Catch a Train or Bus

The cheapest and most effective transport alternative is to leave your car in the garage and start using public transport.

Although public transport also needs fossil fuels to power it along, cars are the energy-devil on wheels. How many people fit into a train or bus compared to a car? The rate of energy and pollution per person heavily favours trains, in particular, and buses compared to cars.

You can start by organising your life — catch the train or bus to work at least one day a week. If you live too far away to walk to a station or a major bus stop, consider getting a lift or even riding your bike to the station. (Refer to Chapter 4 for more tips on how to reduce your reliance on the car.)

Drive More Efficiently

Some car companies are finally starting to do the right thing by constructing cars that are powered by renewable, clean and energy-efficient fuels. Alternative fuels that are less polluting and more energy efficient include gaseous fuels such as hydrogen, LPG and natural gas and ethanol-based fuels. Few affordable alternative fuel new car options are on the market at the moment, although the half combustion engine, half hydrogen powered electric hybrid (such as the Toyota Prius) continues to increase in popularity. Your alternative is to convert your current combustion engine car to an LPG powered car. (Check out Chapter 4 for more on hybrid cars.)

The other option to consider is a motor bike, which is lighter and smaller, and so uses less fuel when moving, and spends less time stopped in the traffic.

Walk or Ride Your Bike

Depending on where you live, work and play, an even better option than public transport is walking or cycling. Absolutely no fossil fuels are used, no emissions are created and you get a bit of exercise to boot! For the really fit, you can ride or walk to and from work, especially if your workplace has showering and change facilities.

Have a think about the trips you can make every day by walking or riding instead of driving your car. If you live too far away to realistically walk or ride your bike anywhere, you may not be living in the most accessible location.