

The use of energy in the home is the largest source of greenhouse gas emissions from Australian households. The average household's energy use is responsible for about eight tonnes of carbon dioxide (CO<sup>2</sup>), the main greenhouse gas, per year. Many of these emissions can be abated through more efficient use of energy in our homes.



The other main contributors to household greenhouse emissions are transport and waste.

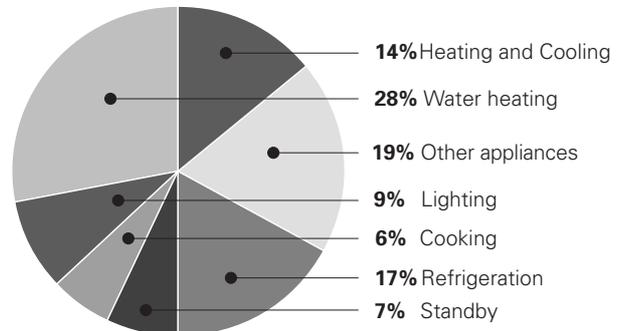
**Choosing** the most appropriate energy source can significantly reduce your energy bills and improve the environmental performance of your home. A choice of energy sources is available to new home buyers, existing owners and tenants.

**Conventional electricity** from the supply grid currently produces the largest amount of CO<sup>2</sup> of any energy source per unit of energy used, except in Tasmania where hydro electric power is used.

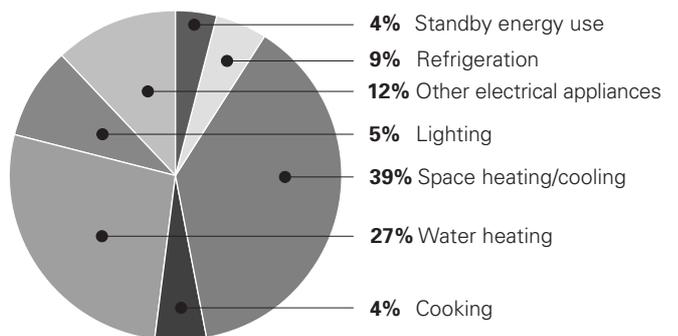
**Renewable energy sources produce no greenhouse gases in operation and reduce or eliminate the need for additional coal fired power stations and large hydro-electric dams.**

**Natural gas** produces only about one third the greenhouse emissions compared to conventional electricity.

**Minimising** demand for energy through conservation and efficiency is the most cost effective means of reducing operational and environmental costs for all home owners and tenants.



*Greenhouse gases from home energy use (based on AGO 1999).*



*Energy use in the average Australian home (based on AGO 1999).*

**Space heating** and cooling and water heating account for nearly 70 percent of household energy use.

**The energy use** and greenhouse gas charts shown above illustrate the different rates at which gas and electricity consumption produce greenhouse gases. The higher the use of electricity, the more greenhouse gas emissions are produced.

**Water heating**, refrigeration and space heating and cooling produce the most greenhouse gases. Other major sources are cooking, lighting and stand-by energy use.

**Look** for ways to reduce consumption through efficient use.

**Monitor your energy bills** and check for unexpected increases and how they can be reduced through more efficient energy use. A list of contacts for information on using energy efficiently can be found at the end of this sheet.

## ENERGY SOURCES

The main sources of household energy are electricity, natural gas and wood. A small number of homes use LPG, coal, coke or heating oil.

Energy can come from either renewable or non-renewable sources. Renewable sources such as solar, wind and hydro-power are naturally replenished and produce very few greenhouse gas emissions when operating. Non-renewable energy comes from diminishing stocks of fossil fuels and can produce large amounts of greenhouse gases.

Most electricity comes from coal fired power stations that release high levels of CO<sub>2</sub> and other pollutants into the environment. Losses in the transmission system from the power station to your home also create inefficiency.

Using natural gas results in only about one third of the greenhouse emissions compared to grid electricity.

Hydro electricity generated in Tasmania directly produces almost no greenhouse gas. However, the construction of new large-scale hydro-electric dams can be sources of large amounts of greenhouse gas and may have other adverse environmental effects.



Arthur Mostead Photography

## ELECTRICITY

Electricity is the most widely available energy source and the only one able to run the full range of household appliances. But on the mainland it is the most greenhouse intensive energy source. It is also usually the most expensive per unit of energy used.

**Consumers of grid electricity can offset its environmental impact by purchasing "Green Power".**

Green Power is often the easiest and least expensive way to purchase electricity from renewable sources.



Most electricity retailers have an accredited Green Power option for a slightly higher unit charge. By choosing Green Power, you are supporting the expansion of renewable systems. Contact your electricity supplier or visit [www.greenpower.com.au](http://www.greenpower.com.au).

Households can generate their own electricity from renewable sources. These can be either grid interactive or self sufficient, stand alone systems. [See: [Renewable Electricity Overview](#)]

Renewable electricity systems are initially expensive to install but have low operating costs and minimum environmental impact. Government rebates are available to offset the initial costs.

Electricity consumption can be reduced through energy efficiency and fuel switching. As energy costs rise and awareness of environmental issues increases, the value of properties with energy efficient features and renewable energy supply is expected to rise.

## GAS

Natural gas is less expensive to use than electricity and produces fewer greenhouse emissions. However, gas is also a non-renewable fuel. It is largely used for water heating, room heating and cooking. It can, however, also be used for clothes drying, as a vehicle fuel and even for refrigeration.



Courtesy of AGL Pty Ltd

Natural gas is not available everywhere but liquefied petroleum gas (LPG) can be used instead. It produces similar greenhouse emissions to natural gas but must be transported by tanker or in cylinders, which adds to its financial and environmental cost. LPG costs more than twice as much to use as natural gas.

Adequate room ventilation is required when using unflued gas appliances. [See: [Indoor Air Quality](#)]

**WOOD**

**Wood** can be a renewable energy source if it comes from sustainably managed forests. Its use should make no net contribution to greenhouse gases if trees are planted to replace those used, but fossil fuels are usually used in collection and transportation.

**In many non-urban areas**, wood is widely used for heating, cooking and heating water. Wood is generally not a desirable energy source for urban areas due to local air pollution problems. Some efficient, low pollution stoves are available but are more expensive.

**OTHER RENEWABLE SOURCES**

**Solar water heaters** and passive solar building techniques reduce the need to use non-renewable energy sources. [See: [Solar Hot Water](#); [Passive Design Introduction](#)]

**OTHER ENERGY SOURCES**

Other fuels such as coal, coke, briquettes and heating oil are available but should only be used in small quantities. Air quality is an issue in urban areas for all solid fuels.

**Energy Source Selection**

The following, in order of priority, will minimise environmental impacts:

- > **Renewable Sources** - such as Green Power, use of on-site generation and solar hot water systems.
- > **Hydro-Electricity** in Tasmania.
- > **Natural Gas** - or LPG when not available.
- > **Wood** from sustainable sources - in urban areas be aware of transport and air pollution impacts.
- > **Grid Electricity** on the mainland.

**EFFICIENT ENERGY USE**

Using energy efficiently is the best way to reduce energy bills and environmental impacts while maintaining or even improving comfort levels.

**Some solutions** cost nothing at all. Most investments in energy efficiency will pay for themselves through lower energy bills.

**HOT WATER**

**Choose** the most efficient hot water service and the best energy source to meet your needs. Solar, gas and electric heat pump systems produce far fewer greenhouse emissions than conventional electric storage systems. Gas boosted solar is the most greenhouse efficient form of water heating.

**Gas heaters** have star ratings accredited by the Australian Gas Association (AGA) to help you choose the most efficient model. The star rating scheme also covers gas ducted and space heaters.

**A list** of star ratings is available on the AGA's website at [www.gas.asn.au](http://www.gas.asn.au). Click on the "Directory of Certified Appliances and Components" on the home page.



Courtesy AGA

**The AGA label** gives an efficiency rating up to six stars and the comparative energy consumption (in the red box) under standard test conditions.

**The higher** an appliance's star rating the better its energy efficiency and the lower its comparative energy consumption.

**To estimate** annual running costs, multiply the energy consumption in the red box by the cost of your gas supply.

**Locate** water heaters close to those areas where hot water is used.

**Showers** usually use the most hot water in a home. Install AAA rated water efficient showerheads. The AAA scheme ensures they will provide a satisfying shower.

**Set** the thermostat between 60 to 65°C on storage hot water systems and 50°C on instantaneous systems.

**Insulate** hot water pipes.

**Turn off** the hot water system when on holidays.

**Put a timer** on the electric booster of solar water heaters and on peak electric storage systems to avoid heating water when not needed. [See: [Hot Water Service](#); [Solar Hot Water](#)]

**Hot water accounts for about 30 percent of household energy use.**

## HEATING AND COOLING YOUR HOME

Use **high efficiency gas**, electric heat pump or wood heaters (where appropriate) for room heating rather than electric convection and radiant heaters. Radiant heaters are suitable for bathrooms when used for short periods of time.

**Use passive design principles to increase comfort and minimise the need for heating and cooling.**

**Gas heaters** and room air conditioners have energy rating labels. Choose the right sized heater or air conditioner for your needs with the most stars on the label.

**Avoid** centralised systems unless your home is well insulated. Ensure centralised systems have zone controls and thermostats.

**Use** ceiling fans instead of air coolers. If cooling is required, use evaporative systems in low humidity areas.

**If air conditioning is needed** choose high efficiency models.

## COOKING EFFICIENTLY

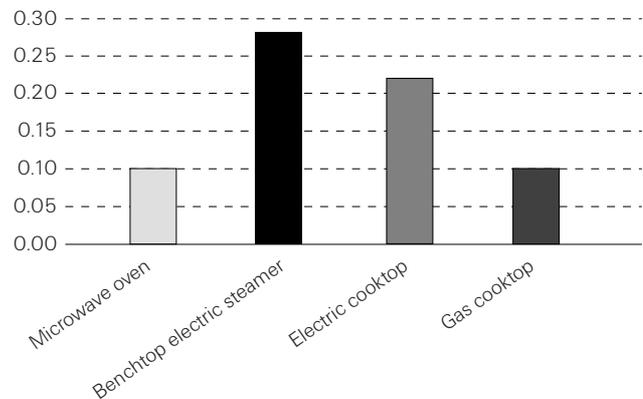
There are currently no energy rating labels for cookers to help choose the most efficient models.

**In general, choose gas cooktops rather than electric. They are cheaper to use, often have more responsive controls and produce less greenhouse emissions.**

**A gas cooktop** will produce less than half the greenhouse gases of a standard electric unit.

**A gas oven** will also usually produce less greenhouse gas than an equivalent quality electric model.

However some very efficient electric cooktops and ovens are available. Ask your retailer or the manufacturer for information.



*kilograms of greenhouse gas generated by cooking a meal of vegetables*

**When using gas**, kitchen ventilation must be adequate. Use a range hood vented outdoors to get rid of combustion gases and steam.

**Fan forced ovens** are about 30 percent more efficient than conventional units, which can waste up to 90 percent of the energy used.

**Some electric ovens** can be divided into compartments for cooking small items.

**Look for ovens** with high levels of insulation and triple glazed, low-e coated windows.

**Avoid** opening the oven door unnecessarily when cooking. Make sure the door seal is clean and in good condition.

**Use a microwave** when possible rather than an oven, as they use less than half the energy.

**Try not to over fill** the kettle. Boil only the amount of water needed.

**Use a kettle** or gas cooktop to boil water rather than a microwave oven or electric cooktop.

**Efficient cooking** methods such as using pots with fitted lids, simmering instead of boiling and using a pressure cooker will save energy.

**Match the size** of pots to the size of the element or flame.

**Cook outside** on hot days if possible to avoid heating the house.

## ELECTRICAL APPLIANCES

**Electrical appliances** account for about 25 percent of household energy use.

**When purchasing** white goods (refrigerators, freezers, clothes washers, clothes dryers and dishwashers) look for the Energy Rating Label. This label gives a star rating and annual energy consumption for the appliance. The more stars, the more efficient the appliance.

**Choose an appliance** with the highest number of stars.

Sometimes an efficient appliance may cost a little more to buy, but it will soon pay for itself in reduced energy bills.

**Buy appliances** that are the right size for you. A larger model will use more energy than a smaller one with the same star rating. Always check the energy label for the number of kWh (units of electricity) used per year.

**Choose** appliances with a 'AAA' rating for water efficiency. [See: [Reducing Water Demand](#)]

**Choose appliances with energy or water saving features, such as clothes washers with cold wash cycles, economy or "eco" cycles and load size selection.**

**Avoid** using appliances unnecessarily. Dry clothes on a line rather than in the clothes dryer.

**Follow** the manufacturer's instructions for defrosting fridges and freezers.

**Use** appropriate load sizes for clothes washers and clothes dryers.

**Locate** appliances that use hot water as close to the hot water service as possible to reduce heat losses in pipes.

**Use** cold wash cycles and other energy saving features.

**Maintain** your appliances according to the manufacturer's instructions. An appliance in poor condition usually uses more energy than one in good condition. [See: [White Goods](#)]

## LIGHTING

**Use fluorescent** or compact fluorescent lamps instead of incandescent bulbs in areas that are used a lot, like living rooms and kitchens.

**Avoid** using low voltage downlights for general lighting as they are not energy efficient.

**Turn off lights** when not needed.

**Use timers** or sensors on outdoor security lights.

**Use separate switches** for each light fitting.

**Consider** using solar lighting for outdoor areas.

**Use the minimum** wattage lamp to provide sufficient light.

**Fluorescent bulbs use about one quarter of the energy of normal bulbs.**

**Use task lighting** to supplement general lighting if needed.

**Use well designed windows** and skylights to provide natural light while keeping winter warmth in and summer heat out. [See: [Lighting](#)]

## REDUCING STAND-BY ENERGY CONSUMPTION

**Stand-by energy** is drawn when some electrical equipment is not actually being used, such as when the TV is turned off with the remote control rather than with the switch on the set or at the wall. It is sometimes used to power digital displays or maintain memory settings, but often it is just wasted energy.

**Be aware** of the standby energy use of electrical equipment such as TVs, videos, clocks, computers, faxes, microwaves, security systems, battery chargers and power packs.

**Stand-by energy use can account for 10 percent or more of household electricity use.**

**Some appliances**, such as videos and microwaves with digital displays, can use much more energy over a year in standby than in actual operation.

**Standby energy** consumption can be reduced by using appliances endorsed with the ENERGY STAR® logo.

ENERGY STAR® is an international standard for energy-efficient electrical equipment developed by the US Environment Protection Authority.



**The standard** only applies to stand-by energy use and does not cover energy used during operation, although ENERGY STAR® equipment is often more efficient in operation too. Electrical equipment that meets the required efficiency standard is labelled with the ENERGY STAR® logo.

In Australia, the program already applies to office equipment such as computers, printers, fax machines and photocopiers. From mid-2001 it will apply to home entertainment equipment such as TVs, VCRs, audio equipment and DVD players.

More information is available on the ENERGY STAR® website at [www.energystar.gov.au](http://www.energystar.gov.au)

The ENERGY STAR® function is not always enabled on new appliances. Ask your retailer to enable it or follow the directions in the instruction manual. Switch equipment off at the power outlet when possible because even ENERGY STAR® equipment still uses some standby power.

## HOME OFFICE AND ENTERTAINMENT EQUIPMENT

**Ensure equipment** is ENERGY STAR® compliant and make sure that it is enabled.

**Large screen TVs** use more energy than those with smaller screens.

**If buying a computer** consider buying a laptop – they require less materials to make and less energy to run.

**An LCD screen** for desktop computers will use less energy and take up less space.

**Switch off computers** and printers if you won't be using them for half an hour or more.

**Look for printers** and faxes and that can use recycled paper. Use recycled ink and toner cartridges. Reuse blank sides of used paper.

**Switch off equipment** at the wall instead of leaving in standby mode, especially when you go on holiday.

### Other Appliances and Equipment

There are many small items around the house that can use a lot of energy over a year, such as pool filter pumps, electric towel rails, computer games, etc. Ensure they are not left on unnecessarily.

## CONTACTS

Australian Capital Territory  
Energy Advisory Service  
Master Builders' Association  
Phone: 02 6247 2126 Internet: [www.mba.org.au](http://www.mba.org.au)

New South Wales  
Energy Smart Information Centre  
Phone: 1300 363 768 Internet: [www.energysmart.com.au](http://www.energysmart.com.au)

Northern Territory  
Natural Resources Division  
Department of Lands, Planning and Environment  
Phone: (08) 8999 4413 Internet: [www.lpe.nt.gov.au](http://www.lpe.nt.gov.au)

Victoria  
Sustainable Energy Authority  
Energy Smart Advisory Centre  
Phone: 1300 363 744 Internet: [www.sea.vic.gov.au](http://www.sea.vic.gov.au)

Queensland  
The Office of Sustainable Energy  
Energy Advisory Service  
Phone: 1300 369 388 Internet: [www.dme.qld.gov.au](http://www.dme.qld.gov.au)

South Australia  
Energy Information Centre  
Toll free: 1800 671 907 Internet: [www.pir.sa.gov.au](http://www.pir.sa.gov.au)

Tasmania  
Environment, Planning and Scientific Services Division  
Department of Primary Industries, Water and Environment  
Phone: 03 6233 6518 Internet: [www.dpiwe.tas.gov.au](http://www.dpiwe.tas.gov.au)

Western Australia  
Office of Energy, Western Australia  
Phone: 1300 658 158 (Home Energy Line)  
Internet: [www.energy.wa.gov.au](http://www.energy.wa.gov.au)

## ADDITIONAL KEY REFERENCES

'Global warming, Cool it' available on Australian Greenhouse Office website [www.greenhouse.gov.au](http://www.greenhouse.gov.au)

AGO Infoline 1300 130 606  
Internet: [www.greenhouse.gov.au](http://www.greenhouse.gov.au)