

Energy Use

The average household's energy use is responsible for over seven tonnes of greenhouse gas emissions. These emissions can be significantly reduced through use of renewable energy, more efficient appliances and energy conservation measures. The Energy Use group of fact sheets shows you how.

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 CO₂ of any energy source per unit of energy used, except in Tasmania where hydro electric power is the predominant source of electricity. Hydropower is used to a lesser extent in some other states, with fossil fuel power stations providing most of the electricity on the Australian mainland.

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 gas 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.

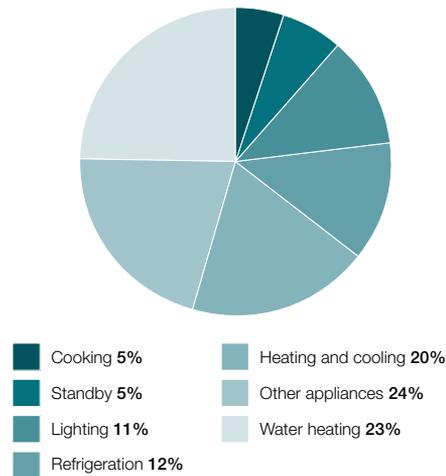
Space heating and cooling and water heating account for nearly 63 per cent of household energy use.

Heating and cooling, appliances (such as refrigerators, televisions and computers) and water heating use the most energy in the home and generate the most greenhouse gas emissions.

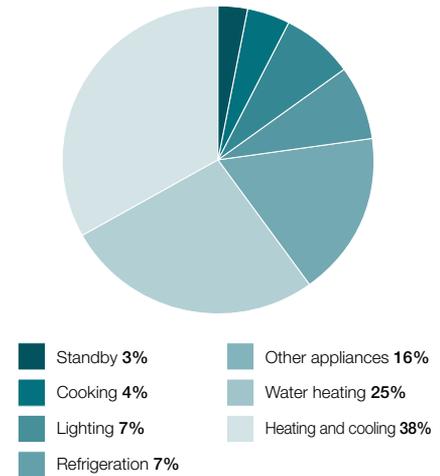
Look for ways to reduce consumption through efficient use.

Monitor your energy bills and check for unexpected increases and how they can be reduced through more efficient energy use.

Greenhouse gas emissions from home energy use (Baseline Energy Estimates, 2008)



Home energy use (Baseline Energy Estimates, 2008)



The percentage of greenhouse gas emissions from home energy use depends on the carbon intensity of the energy source. For example, the carbon intensity of electricity is much higher than that of natural gas or wood per unit of delivered energy. Therefore, although heating and cooling is the highest energy use in the home, as natural gas is typically used for heating, it is not the highest greenhouse gas emitter.

The NABERS Home Rating tool can be a valuable tool to track energy and water use.

[See: 1.5 rating Tools]

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 CO₂ 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 gas 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.

Electricity

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

Consumers of grid electricity can help offset environmental impact by purchasing 'GreenPower'.

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





Arthur Mosteard Photography

Most electricity retailers have an accredited GreenPower option for a slightly higher unit charge. By choosing GreenPower, you are supporting the expansion of renewable systems. Contact your electricity supplier or visit www.greenpower.gov.au.

Households can generate their own electricity from renewable sources. These can be either grid interactive or self sufficient, stand alone systems. [See: 6.6 Renewable Energy]

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 houses with energy efficient features and renewable energy supply is expected to rise in the market.

Gas

Natural gas is less expensive to use than electricity and produces fewer greenhouse gas 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.



ACTEWAGL

Natural gas is not available everywhere but liquefied petroleum gas (LPG) can be used instead. It produces similar greenhouse gas 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: 3.3 The Healthy Home]

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: 4.1 Passive Design Introduction; 6.5 Solar Hot Water]

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.

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

- 1. Renewable sources** – such as GreenPower, use of on-site renewable electricity generation and solar hot water systems.
- 2. Hydro-electricity** – available in Tasmania.
- 3. Natural gas** – or LPG when not available.
- 4. Wood from sustainable sources** – in urban areas be aware of transport and air pollution impacts.
- 5. Grid electricity** – available 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 gas emissions than conventional electric storage systems. Gas boosted solar is the most greenhouse efficient form of water heating.

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

Showers usually use the most hot water in a home. Install WELS 3 Star rated water efficient showerheads. The WELS 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.

Hot water accounts for about 25 per cent of household energy use.

Put a timer or manual boost switch on the electric booster of solar water heaters and on peak electric storage systems to avoid heating water when not needed. [See: 6.5 Hot Water Service]

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.

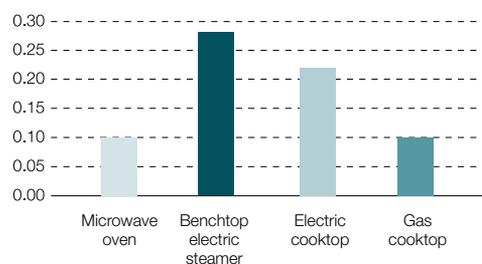
In general, choose gas cooktops rather than electric. They are often cheaper to use, and have more responsive controls and produce less greenhouse gas emissions.

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 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 per cent more efficient than conventional units, which can waste up to 90 per cent 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.

Appliances

Electrical appliances account for about 30 per cent 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 WELS star rating for water efficiency. [See: 7.2 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.

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: 6.4 Appliances]

Other 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 and computer games. Ensure they are not left on unnecessarily.

Lighting

Use fluorescent or compact fluorescent lamps – they are energy efficient and long lasting.

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

Compact fluorescent replacements for down lights are becoming available.

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: 4.10 Glazing; 4.11 Skylights; 6.3 Lighting]

Reducing stand-by energy consumption

Standby 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.

Standby energy use can account for 10 per cent 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.

The program applies to home entertainment equipment such as computers, monitors, printers, TVs, DVD players, audio equipment and faxes.

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.

More information is available on the ENERGY STAR® website at www.energystar.gov.au

Home office and entertainment equipment

Ensure equipment is ENERGY STAR® compliant and make sure that energy efficiency features are 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 that can use recycled paper. Use recycled ink and toner cartridges. Re-use blank sides of used paper.

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

ADDITIONAL READING

Contact your State / Territory government or local council for further information on energy efficiency, including what rebates are available. www.gov.au

Australian Energy Star, Australian Government www.energystar.gov.au

Australian Greenhouse Office (2005), *National Greenhouse Gas Inventory 2005*. www.greenhouse.gov.au/inventory/2005/pubs/inventory2005.pdf

Department of the Environment, Water, Heritage and the Arts. 2008. *Australian Residential Sector Baseline Energy Estimates 1990 – 2020*.

Energy Rating www.energyrating.gov.au

Global Warming Cool It, Australian Government www.greenhouse.gov.au/gwci

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