

Electricity Saving Hints

Here are 15 hints for reducing electricity use in your home. Every household is different, so the savings you make might not exactly match those indicated below; but the point is that by making relatively small changes you can maintain your lifestyle but save hundreds of dollars on your electricity bills.

The Information Sheets in this Kit provide more detail about potential savings and list many other options for making your home more electricity efficient.

EASY, NO-COST ACTIONS (BUT YOU NEED TO MODIFY YOUR BEHAVIOUR)

1. Switching off - turn off lights, TVs, heaters, radios and computers when they are not required; it is easy to reduce electricity use by 1 to 2kWh per day, or more, saving \$75 to \$150 per year.
2. Turn off all appliances that have remote controls at the power point if you are not using them (TVs, music systems, air conditioners, etc.). A typical house will save \$2 to \$5 per appliance per year.
3. Turn off any appliances with clocks at the power point if you do not need the clock. Each unnecessary clock costs you \$3 or \$4 per year in electricity.
4. Keep your refrigerator in as cool a spot as possible; make sure it is not in direct sunlight. Better positioning of your fridge or freezer could save \$30 to \$50 per year.
5. Make sure air can circulate behind and up the sides of your fridge or freezer. There should be a 3 to 5cm gap at the rear and 2 to 3cm each side. Inadequate ventilation can add up to \$100 to annual electricity bills.
6. Wash small loads of dishes in the sink instead of the dishwasher, use of a dishwasher every day costs \$100 to \$150 per year in electricity.
7. Keep doors closed leading to unheated parts of your house. Potential savings vary from house to house.
8. Dry your clothes on the line instead of in the clothes dryer whenever possible. It costs roughly 60 cents in electricity to dry a load of clothes in the dryer.

LOW-COST ACTIONS

9. If you have no ceiling insulation, or very little, you can get free insulation installed (in most cases) through the Australian Government Energy Efficient Homes Program (this program was still operating at time of preparing these sheets). Substantial energy savings and improved comfort are possible.
10. Add extra insulation to your hot water cylinder. Extra insulation on a typical hot water cylinder can save up to \$200 per year in electricity use.
11. Fit a low-flow shower head. Reduced hot water use can save up to \$100 per year in electricity for a family of 4.
12. When buying new appliances, purchase those with the most stars (i.e. the most efficient models). Often these do not cost any more than less efficient models.

MEDIUM-COST ACTIONS

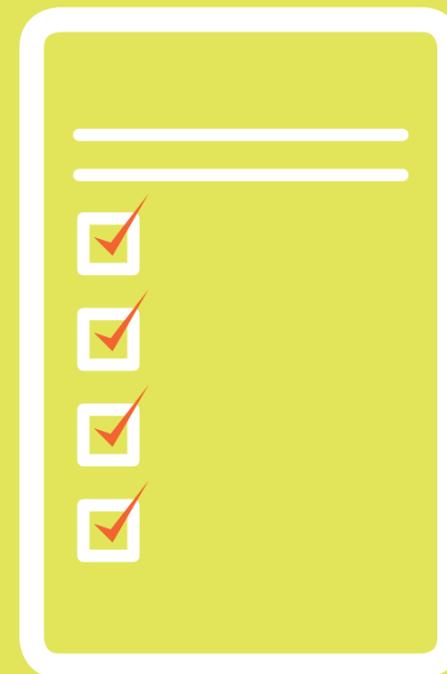
13. If you have a wooden floor, install insulation under the floor. Improved comfort and reduced heating costs can be substantial.
14. If your home has ceiling insulation, consider adding additional insulation to improve the homes thermal performance.
15. Consider double glazing for your windows. This can be quite expensive so seek professional advice on costs and potential savings.

How to use the equipment in the kit

This Home Energy Audit Toolkit includes:

- a Power-Mate electricity meter
- an infrared radiometer
- a thermometer
- a stopwatch
- a compass

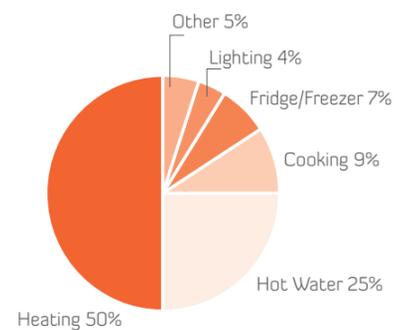
These notes provide instructions on the use of each of these items and some important safety precautions to always keep in mind when doing your audit. These items are not toys and should only be used by adults, or children under close adult supervision.



Before trying out the equipment in the tool kit it is useful to think about what you are hoping to achieve by measuring how much electricity various appliances use. Reducing your electricity use is a little like a detective activity. You need to look for clues about why your electricity bill is as large as it is, and then decide on practical ways to reduce your bill without disrupting your life too much.

Information sheets and the energy monitoring equipment in this kit will help you to understand why you pay as much as you do for electricity, but more importantly they will help you in making decisions that could save you hundreds of dollars each year.

Electricity use in a typical Tasmanian home



With a little care it should be possible to cut your electricity use by 25%, giving savings of up to \$500 per year. If you are already very careful about how you use electricity it will be harder to make this much saving, but you might be able to improve your comfort levels without using more electricity.

The chart on the left shows where a typical Tasmanian household uses their electricity.

Remember that every household is different. If you use a woodheater or a gas heater you will obviously use less electricity for heating.

Every household is different, some have electricity use quite close to the average but the mix between heating, hot water and other is not the same as the chart; others have much higher or much lower electricity use overall. This is why it is a good idea to understand your own household's electricity use before deciding on your best options for becoming more efficient.

1. Some electrical appliances are high power and are used for many hours at a time; these include electric space heaters (including heat pumps) and hot water cylinders. These consume a lot of electricity and account for most of your electricity bill. They need special attention when trying to cut electricity use and electricity bills.

2. Many appliances are high power but are only used for short periods; these include microwave ovens, cook-tops/ovens, washing machines and dryers, dishwashers, hair dryers, vacuum cleaners, irons, toasters, electric jug/kettles and some workshop and garden tools. These are low to medium consumers of electricity when averaged over a year; sensible operation can make useful cuts to electricity bills.

3. There are also many appliances that have very small power consumption, but if they are on all the time they can add many dollars to electricity bills. In some cases simply turning an appliance off at the power point can save from a few dollars up to \$100 per year.

Everyone will have noticed that electricity prices have gone up over the past few years. It is likely that prices will continue to rise faster than inflation, with some commentators suggesting they could double in just a few years. The most effective way of shielding yourself from these price increases is to use electricity more efficiently. It does not mean doing without warm homes or cooked meals, it means enjoying the benefits of electrical appliances but using them so that they consume less electricity.

Now read on to see how the gadgets in the kit are used.

If you require any assistance in the use of the HEAT please contact Sustainable Living Tasmania on 6234 5566.

POWER-MATE ELECTRICITY METER

This handy device will allow you to measure how much electricity various appliances are using in your home. By recording some of the readings you can work out how much different appliances cost to run and how much you could save if you use the appliances efficiently.

Always turn off the electricity at the power point when plugging appliances into the Power-Mate and when unplugging appliances.

First try out the Power-Mate on a convenient household appliance, a TV or desk lamp for example.

1. Turn off the power point, unplug your appliance, plug the Power-Mate into the power point, plug your appliance into the back of the Power-Mate plug.
2. Turn on the power point and the Power-Mate screen will come on. The screen will switch between a number and the word POWER. This is showing the power used by the appliance measured in Watts (W). If it is zero (e.g. for a desk lamp when the lamp is off) it just means no power is being used. If a TV is plugged in (TV off) it will probably show a small number (e.g. 0.83) meaning that even when the TV is off it is using a little bit of electricity (0.83 W). When the lamp or TV is switched on the reading will jump to a larger reading which might be steady (e.g. a lamp reading 40.00, or 40 W) or it might fluctuate a bit (e.g. a TV with numbers jumping around from 58.00 to 70.00 as different scenes appear on the TV).

This is all that is required to measure the power (W) of any plug-in appliance in your home. In the accompanying information sheets you will see how this can help you save money through sensible use of appliances. But some appliances switch motors or heating elements on and off automatically (e.g. a fridge or a dishwasher) so just measuring the power used at any single moment does not tell you the whole story. What you need to know is how much energy was used over a full day.

3. To use the full potential of the Power-Mate you need to go to SETUP? Push the 'Mode' button. Then press 'Enter' and the screen will show S rAtE, press 'Enter' again and a number will appear with one digit flashing. This is where you enter the cost of electricity. In Tasmania at the moment (2010) electricity costs about 20 cents per kWh. So if it is not showing 20.00 already you need to use the '+' and '-' buttons to adjust each number (to move from one digit to the next use

the 'Enter' button). When you get back to S rAtE push the 'Mode' button and S gAS will appear. This is the amount of greenhouse gas emitted for each kWh of electricity. Push 'Enter' and then, using the '+' and '-' buttons, set it to 1.067. This is the average kg of greenhouse gas emitted for each kWh generated in eastern Australia: this is how much you save each time you avoid using 1 kWh of electricity.

4. To measure the electrical energy (kWh) used by an appliance you must first clear the Power-Mate (get its memory back to zero). This is easy. Push the 'Mode' button seven times until the screen shows CLEAR? Press 'Enter' and the screen will show donE and then change to SETUP? (it will continue to give the SETUP option even though the set-up is complete). Now press 'Mode' and you will be back at the power reading.

Leave the Power-Mate operating with the light or TV on for a few minutes. Then press the 'Mode' button twice so that EnErgY appears on the screen. The screen will then flip to a number (e.g. 0.0057). This means that since you cleared the memory 0.0057 kilowatt-hours (kWh) of electricity has been consumed. If you watch, you will see that the number keeps going up, meaning that over time you are using more and more electricity (kWh). Press the 'Mode' button four more times and the screen will show HourS. This is the time (shown as hours:minutes:seconds) since you cleared the memory.

The energy reading is very useful for something like a dishwasher, washing machine or clothes dryer because you can set up the Power-Mate and leave it for a full wash or dry cycle and find out how much electricity was used for the full cycle.

5. When you see the instantaneous power your appliance is using; push 'Mode' and you see the cost of electricity (in dollars) used since you last cleared the memory; push 'Mode' again and you see the energy used (in kWh) since you last cleared the memory; push 'Mode' again and you see the greenhouse gas emissions (in kg of CO₂) emitted by generating that much electricity; push 'Mode' again and you see what your voltage is; push mode again and you see how much current (in amps) your appliance is using; push 'Mode' again and you see the time since you cleared the memory; push 'Mode' again and you get to CLEAR? where you can clear the memory and start measuring energy from zero again; press 'Mode' again and you get to SETUP and finally back to the starting point POWER.

INFRARED RADIOMETER

An infrared radiometer measures the surface temperature of whatever it is pointing at. This can be useful for finding hot spots or cold spots on walls, ceilings, floors, hot water cylinders, fridges. It is very simple to operate: just point at the surface and pull the trigger, the temperature will show on the screen.

The device also has a laser beam so you know exactly where you are pointing. To turn the laser on press the red button on the radiometer. Press it again to turn the laser off.

A laser can cause permanent eye damage if shone into someone's face. For this reason young children should not be allowed to use the infrared radiometer.

An infrared radiometer is a useful instrument because it measures the 'radiant' temperature of the surface it is pointing at. The radiant temperature can be slightly different to the actual temperature because the surface emissivity influences the radiant temperature. Rough surfaces and dark coloured surfaces have high emissivity so the radiant and actual temperatures are about the same. But shiny surfaces can reflect radiation so you might not be measuring the true surface temperature.

CONVENTIONAL THERMOMETER

It is pretty obvious how the conventional thermometer works, but you must be mindful of the fact it does not give an instantaneous reading. In air it is necessary to leave it for about 15 minutes to stabilize at the true air temperature. So if you want to see what the temperature of your fridge is you must leave it for 15 minutes or more and then read it straight away when you take it out.

In water it reaches the true temperature much faster, just one or two minutes. But after it has been in water it will not give the true air temperature until it is fully dried off (the evaporating water cools the thermometer below air temperature).

COMPASS

The red arrow of the compass points to the magnetic north pole. Unfortunately this is not exactly the same direction as true north, and true north is where you want to point your solar hot water system or photovoltaic array. The correction is about 15°. If you are holding your compass in front of you and you are facing due magnetic north then true north is 15° to the west (to your left).

Using your Power-Mate

The '+' and '-' buttons can be used to access additional information as shown in the following Table. Probably most useful is the cost function because it shows how much it will cost if you use this appliance continuously for one hour, for a whole quarter, or for a whole year.

Screen	Press '+'	Press '-'	Press 'Enter'
POWER	Watts (now)	Watts* (peak)	Watts* (minimum)
COSt	Cost* (dollars)	cost per hour	cost per quarter cost per year
EnErgY	Energy* (kWh)	Energy per hour	Energy per quarter Energy per year
G GAS	GHG* (kg CO ₂)	GHG per hour	GHG per quarter GHG per year
VoltS	Volts (V) (now)	Volts* (peak)	Volts* (minimum)
Curr	current (amps)	current* (peak)	current* (minimum)
HourS	Shows hour: minutes: seconds since clearing memory		
CLEAR?	To clear the memory press 'Enter'		
SETUP?	To set the electricity price (cents/kWh) and greenhouse gas intensity (kg/kWh)		

* when the memory is cleared, these values go back to zero and start building up again

