Waste Recycling and Energy Saving

Edited by Justin Healey

ISSUES IN SOCIETY
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**INTRODUCTION**

_Waste Recycling and Energy Saving_ is Volume 403 in the ‘Issues in Society’ series of educational resource books. The aim of this series is to offer current, diverse information about important issues in our world, from an Australian perspective.

**KEY ISSUES IN THIS TOPIC**

Australians dispose of about 21 million tonnes of household waste per year. Although we have made general improvements in our waste disposal habits over recent years, there is always more we can do to reduce, reuse and recycle.

And in an age when avoiding rising energy consumption (and costs) is integral to reducing emissions-related impacts on climate change, many Australians are becoming more interested in exploring how to conserve their energy use.

What are the best ways we can avoid creating excess waste and at the same time become more efficient with our power consumption?

This book is a handy guide on how we can all live more sustainably by applying the most effective approaches to better manage our household waste and energy use. Learn how to become a sustainable consumer and reduce your carbon footprint.

**SOURCES OF INFORMATION**

Titles in the ‘Issues in Society’ series are individual resource books which provide an overview on a specific subject comprised of facts and opinions.

The information in this resource book is not from any single author, publication or organisation. The unique value of the ‘Issues in Society’ series lies in its diversity of content and perspectives.

The content comes from a wide variety of sources and includes:

- Newspaper reports and opinion pieces
- Website fact sheets
- Magazine and journal articles
- Statistics and surveys
- Government reports
- Literature from special interest groups

**CRITICAL EVALUATION**

As the information reproduced in this book is from a number of different sources, readers should always be aware of the origin of the text and whether or not the source is likely to be expressing a particular bias or agenda.

It is hoped that, as you read about the many aspects of the issues explored in this book, you will critically evaluate the information presented. In some cases, it is important that you decide whether you are being presented with facts or opinions. Does the writer give a biased or an unbiased report? If an opinion is being expressed, do you agree with the writer?

**EXPLORING ISSUES**

The ‘Exploring issues’ section at the back of this book features a range of ready-to-use worksheets relating to the articles and issues raised in this book. The activities and exercises in these worksheets are suitable for use by students at middle secondary school level and beyond.

**FURTHER RESEARCH**

This title offers a useful starting point for those who need convenient access to information about the issues involved. However, it is only a starting point. The ‘Web links’ section at the back of this book contains a list of useful websites which you can access for more reading on the topic.
CHAPTER 1
Household waste and recycling

WASTE GENERATION BY INDUSTRY AND HOUSEHOLD

How much waste is generated in Australia?
Following are the main findings from Waste Account, Australia, published by the Australian Bureau of Statistics

WASTE GENERATION BY INDUSTRY AND HOUSEHOLD

• During 2010-11, the Australian economy generated 53.0 million tonnes of waste, including imports. This was a slight decrease on 2009-10 (53.8 million tonnes).
• Of the total waste generated 30.8 million tonnes (58%) was recovered with 22.2 million tonnes (42%) disposed to landfill.
• The Construction industry and the Household sector each generated over 14 million tonnes of waste, representing over half (54%) of the total waste generated.
• The bulk of waste generated by the Construction industry was masonry. Masonry materials, accounted for 16.3 million tonnes (31%) of total waste generated in 2010-11, down from 19.8 million tonnes, or 37% of the total waste generated in 2009-10.
• The Construction industry produced 10.9 million tonnes (67%) of all masonry waste in 2010-11, a 2.8 million tonnes (or 21%) decrease from 2009-10.
• In 2010-11, households produced 14.3 million tonnes of waste (or 27% of total waste generation), an increase from 12.5 million tonnes (or 23% of total waste generation) in 2009-10.
• Organic waste was the second largest type of waste type generated in 2010-11 after masonry waste, at 13.7 million tonnes or 26% of total waste generation. Households generated the most organic waste, 6.7 million tonnes or 49% of total organic waste.
• Most other waste products showed increases from 2009-10 to 2010-11. Exceptions were paper and cardboard (a 22% decrease on 2009-10, with the bulk of this occurring in the Household sector), and solid hazardous waste (a 10% decrease between 2009-10 and 2010-11).

WASTE MANAGEMENT

Most waste is managed by the Waste Management Services Industry. This includes those businesses whose main activity is waste management as defined by the Australian and New Zealand Industry Classification (ANZSIC) 2006 (ANZSIC Division D, subdivision 29) and waste management activities of local government. Waste that is managed/treated by non-waste management businesses and exports of waste are also covered.

There are broadly three ‘destinations’ for Australia’s waste:
1. Disposal to landfill.
2. Recovered for the domestic economy (includes energy recovery).
3. Exports (part of total recovery).
   - Of the total waste generated in 2010-11, 30.8 million tonnes was recovered, which included 27.1 million tonnes domestic recovery and 3.7 million tonnes that was exported. Total waste sent to landfill was 22.2 million tonnes.
   - Total waste to landfill decreased by 14% between 2009-10 and 2010-11 (from 25.9 million tonnes to 22.2 million tonnes).

**Plastic waste sent to landfill increased from 1.2 million tonnes in 2009-10 to 1.9 million tonnes in 2010-11.**

- Waste recovery increased from 52% in 2009-10 to 58% in 2010-11. Of the 30.7 million tonnes of recovered waste in 2010-11, 11.4 million tonnes was masonry materials and 7.2 million tonnes was organic waste.
- In 2010-11, organic waste was the largest type of waste disposed to landfill (6.4 million tonnes or 29%) followed by masonry materials (4.9 million tonnes or 22%).
- The largest reductions in waste materials sent to landfill were masonry (8.9 million tonnes in 2009-10 to 4.9 million tonnes in 2010-11), and paper and cardboard (2.5 million tonnes to 1.7 million tonnes). Plastic waste sent to landfill increased from 1.2 million tonnes in 2009-10 to 1.9 million tonnes in 2010-11.
- The Waste Management industry accounted for 62% of the total tonnage for landfill and recovery. Businesses outside the Waste Management industry were responsible for 55% of the total waste recovered.
- In 2010-11, 1.9 million tonnes of metal waste was exported which represented 53% of total waste exports.

**SUPPLY AND USE OF WASTE MANAGEMENT SERVICES AND PRODUCTS, 2010-11 ($m)**

*Waste management services*

- Businesses and government supply (provide) waste management services which are used (consumed) by other businesses, government and households. Waste management services include income from a range of services relating to waste management including collection, transport, recycling, treatment, processing or disposal of waste. In 2010-11, the supply of these services was valued at $10,430m (including taxes) an increase of 8% or $808m from 2009-10.
- Private (includes public trading enterprises) waste management businesses supplied just over half (53% or $5,558m) of the value of these services while local government provided just over one quarter (26% or $2,711m).
- Income from waste management activities related to non-recyclable waste services, provided by the waste management services industry was valued at $6,934m ($4,660m from private businesses and $2,274m from public enterprises), an increase of 8% or $511m from 2009-10.
- Waste management services are used or ‘consumed’ by businesses as part of their production processes (this expenditure is termed intermediate consumption), or by households as final consumption. In 2010-11, the waste management services industry consumed 33% or $3,231m ($1,621m from private businesses and $1,610m from public enterprises) of these services with the construction industry using 18% or $1,841m.
- In 2010-11, Households spent $1,861m on waste management services (recyclable and non-recyclable combined), mostly on municipal rates, related to waste management services. This was an increase of $149m (or 9%) on 2009-10. Household expenditure constitutes 18% of total expenditure on waste management services.

**FIGURE 2: WASTE MANAGEMENT BY MATERIAL 2010-11**


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Waste Recycling and Energy Saving

Issues in Society | Volume 403
Recyclable/recovered material

- In 2010-11, Australian businesses (and government) sold recyclable/recoverable waste material to the value of $5,448m, an increase of $838m (or 18%) on 2009-10.
- The waste management industry supplied 54% or $2,937m (from private businesses and $55m from public enterprises) of the value of these products in the form of sales of raw materials (e.g. paper, cardboard, metals, organic material etc) resulting from materials recovery or reprocessing operations.
- Non-waste management businesses supplied 45% or $2,427m of the total sold recyclable/recoverable waste materials. Manufacturing ($741m), Wholesale ($582m) and Retail ($565m) made up over 75% of this income.
- In 2010-11, nearly 60% ($3,252m) of the total amount of recyclable/recoverable materials supplied to the economy were consumed domestically with the remaining 40% ($2,196m) exported.
- Manufacturing consumes just over half (51% or $2,774m) of the total value of these recyclable/recoverable materials, of which $1,378m is for metals scrap.

International Trade of Waste

- In 2010-11 Australia exported 3.7 million tonnes of waste valued at $2,196 million or 9.9% of Australia’s total exports. The value of Australia’s waste exports has increased significantly from $527 million in 2000-01 and the share of total exports has risen from 0.4% in 2000-01.
- Australia imported 0.7 million tonnes of waste material valued at $84 million in 2010-11, representing 0.1% of the value of Australia’s total imports. There has only been a small increase in the share of waste imports to total imports, increasing from 0.3 million tonnes of waste material valued at $58 million in 2000-01 (0.05% of the value of Australia’s total imports).

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National waste generation and resource recovery profiles and trends

An overview from the National Waste Reporting 2013 report published by the Department of the Environment

Key fact: Over the period 2006-07 to 2010-11, the resource recovery rate in Australia increased 9 per cent – from 51 per cent to 60 per cent.

2010-11 WASTE GENERATION

In 2010-11 Australians on average generated 2.2 tonnes per capita of waste, 60 per cent of which was recycled or recovered for embodied energy. Inclusion of fly ash from coal fired power stations increases the average per capita waste generation by 28 per cent to 2.8 tonnes, with a resource recovery rate of 56 per cent. In total, Australians generated around 48 million tonnes (Mt) of waste excluding fly ash, and 62Mt including fly ash (see Figure 1).

Figure 2 illustrates the waste generation total for each jurisdiction, showing the tonnages by management and the recovery rates.

AUSTRALIAN PER CAPITA TRENDS, 2006-07 TO 2010-11

Between 2006-07 and 2010-11:
- Waste generation per capita in Australia was reasonably stable at around 2.1 tonnes per capita per year, with a small increase of 2.6 per cent over the period, or 0.6 per cent per year.
- The resource recovery rate in Australia increased from 51 per cent to 60 per cent (excluding fly ash).
- Waste recycling per capita in Australia rose by around 20 per cent over the period, or 4.6 per cent per year, from around 1.0 tonne to around 1.2 tonnes per capita per year.
- Material used for producing energy from waste in Australia increased marginally from 60kg to 70kg per capita per year, or 8 per cent per year.
- Waste disposal in Australia decreased, falling from around 1.03 tonnes to around 0.88 tonnes per capita per year, representing a fall of around 15 per cent in four years, or 4.0 per cent per capita per year.

Figure 3 below shows per capita waste generation and management trends for the period 2006-07 to 2010-11.

AUSTRALIAN TOTAL WASTE GENERATION TRENDS, 2006-07 TO 2010-11

Between 2006-07 and 2010-11:
- Australia continued to generate more waste as the population grew, with waste generation increasing from around 44Mt to around 48Mt per year, an increase of 9.1 per cent per year, or 2.2 per cent per year.
- The total quantity of material recycled in Australia increased significantly from 21.4Mt to 27.3Mt per year, or by about 27 per cent in four years, or 6.3 per cent per year.
- Australia’s total energy recovery increased from about 1.32Mt to 1.52Mt per year, or by about 15 per

Figure 3: Trends in per capita waste generation and management, 2006-07 to 2010-11

Note: Relies on: population-based backwards extrapolation for NT (06-07 – 09-10) and Qld (06-07); and interpolation for all jurisdictions (07-08) and NSW (09-10).
cent over four years, or 3.6 per cent per year.

- Australia’s total disposal tonnage decreased from about 21.5Mt to about 19.5Mt per year, or by about 9 per cent over four years, or 2.5 per cent per year.

- The resource recovery rate in Australia increased from 51 per cent to 60 per cent between 2006-07 and 2010-11, an increase of 9 per cent.

**Figure 4** below shows total waste generation and management trends for the period 2006-07 to 2010-11.

**Figure 4: Trends in total waste generation and management, 2006-07 to 2010-11**

For more information on:

- Per capita waste generation see the overview on state and territory waste generation and resource recovery data, the factsheets on jurisdictional waste profiles or *Waste generation and resource recovery in Australia*.

- National waste generation and resource recovery profiles and trends see *Waste generation and resource recovery in Australia*.

**NOTE**

1. The content for this overview has been drawn from *Waste generation and resource recovery in Australia* (WGRRiA), 2013. Additional sources on hazardous waste data indicate that hazardous waste generation in Australia for 2010-11 has been under-reported in WGRRiA data. The hazardous waste overview shows higher hazardous waste generation in Australia of approximately 6.16 million tonnes in 2010-11, which suggests that overall waste generation is higher than shown here. More information on hazardous waste in Australia is provided in the hazardous waste overview and the *Hazardous Waste Data Assessment*.

**ABOUT THE DATA**

Unless otherwise specified, waste generation and resource recovery data for this overview were sourced from Blue Environment and Randell Environmental Consulting’s *Waste generation and resource recovery in Australia* (2013). It is important to note that the data (from this report) will not always reconcile with publicly reported data from the states and territories. The differences in data result from differences in scope, method of compilation, and assumptions used in the workbooks provide transparency so that differences between the reported data sets can be reconciled if necessary.

The headline figures are based on hazardous waste data from *Waste generation and resource recovery in Australia* (2013). Additional sources on hazardous waste data indicate that hazardous waste generation in Australia for 2010-11 has been under-reported in this report. The *Hazardous Waste Data Assessment* is the current best estimate of hazardous waste generation, recovery and disposal available in Australia. It includes key amounts of hazardous waste (such as hazardous wastes that do not move across borders, liquid hazardous wastes, and hazardous wastes not reported in *Waste generation and resource recovery in Australia*). For more discussion see the overview on hazardous waste or the *Hazardous Waste Data Assessment*.

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The 2015 Rubbish Report is a snapshot of rubbish removed by Clean Up Australia Day volunteers. Nationally, the report is based on rubbish surveyed from 724 sites.

**Notable Changes from 2014**
- Plastic items increased by 6% [30% in 2014]; and metals by 2%
- Two categories decreased: polystyrene by 1% and miscellaneous by 7%
- Glass, rubber and wood both remained consistent with last year.

**Interesting Facts**
- Grouped Top 10 data made up 97% [84.4% in 2014] of reported rubbish. Individual Item Top 10 data = 47.2% [54% in 2014]
- Within grouped data, beverage containers represented 23.6% of the whole rubbish count [25% in 2014] and 21.1% of the Top 10 individual items [15% in 2014]. Within these counts glass alcohol bottles increased by 0.6%; PET fell by 0.5%; cans rose by 2.8%. Associated beverage rubbish rose by 0.5%
- Food packaging counts significantly increased in 2015 to 16.7% [8% in 2014]
- Cigarette butt counts reduced by 8.4%
- All confectionery wrappers rose by 1.7%
- All plastic bags rose by 4%; with garbage/rubbish bags back in the individual Top 10.

**The Most Polluted Sites**

While Parks were the most popular site surveyed in 2015, Outdoor transport location recorded the highest average number of rubbish items per site of 604, which was a dramatic drop on 2014 when this location reported an average count of 9,210.

*Three locations reported increased average rubbish counts in 2015:*
- Parks’ counts increased by 65 to 282 across 215 sites
versus 217 across 156 locations in 2014.

- Waterways increased average counts to 319 across 133 locations [278 across 113 sites last year]
- School grounds reported 250 items across 81 locations, versus 76 from 46 sites in 2014.

Remaining locations reduced their average count in 2015:

- Roadways reduced their average count by 131 items per site [327 across 174 locations versus 458 across 132 locations]
- Beach/coastal areas reduced to 357 over 98 locations [405 across 94 sites in 2014]
- Bushland recorded 301 items over 114 sites this year versus 323 over 89 locations in 2014
- Shops/malls average count reduced to 336 from 25 locations [542 from 18 sites last year]
- Other [non-specified] location reported an average of 236 items from 52 sites [329 from 52 sites last year]
- Two dive sites reported an average of 122 items this year [257 from 3 locations in 2014].

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RECYCLING

FACT SHEET ADVICE FROM THE FEDERAL GOVERNMENT WEBSITE, YOUR ENERGY SAVINGS

Recycling means your waste products go on to become useful to someone else. Recycling also helps make sure that there’ll be enough resources left for later generations.

By using waste materials rather than new materials, manufacturers can avoid the cost and impacts of extracting, refining, transporting and processing raw materials. It also means that the amount of waste going to landfill is reduced.

Kerbside recycling

There are many items we commonly use in our homes which can be recycled. In many areas, local councils make recycling at home really easy by offering a kerbside recycling service. Over 90 per cent of Australians have access to kerbside recycling.

Councils provide special bins for recyclable materials which are collected alongside your normal garbage. Material collected is taken to a sorting facility and then sent to other places where the materials can be made into something new.

Kerbside recycling services usually collect:

- Paper and cardboard
- Glass bottles and jars
- Rigid (hard) plastic
- Steel and aluminium products like cans, foil and pie trays.

The materials that can and can’t be put into kerbside bins vary in different areas, so contact your local council to find out exactly what you can put in your recycling bin.

Putting the wrong materials in your recycling bin may lead to large amounts of recyclable material being sent to landfill because it’s too difficult to separate them out.

Items that can’t be put in your recycling bin

There are many things that shouldn’t be put into your recycling bin. The exact list will vary between different areas, but usually items that shouldn’t be placed in your recycling bin include:

- Hazardous waste such as batteries, motor oil, chemicals, paints, and used lighting products containing mercury including compact fluorescent lamps
- Food scraps
- Soft plastics such as pasta and rice bags, shopping bags and cling wrap
- Ceramics, crockery and glass cookware
- E-waste such as televisions, mobile phones, computers and accessories
- Electrical goods
- Electrical leads, rope or hoses
- Clothing, linen and shoes
- Nappies
- Cooking oil.

These items can cause contamination or damage to the machinery in the recycling centre. Check with your local council to find out if there’s a collection point near you that accepts e-waste, furniture or domestic quantities of hazardous materials and what types of materials are accepted. Some of these items, if in good condition, can also be recycled through your local charity or second-hand shop.

Hazardous waste must not be included in your normal garbage. Check with your local council about waste disposal and recycling facilities for hazardous waste in your area.

Australians dispose of 90 per cent of their glass in recycling bins, but less than half of this can be used.
in recycling. Toughened glass that melts at higher temperatures (such as window panes, drinking glasses, ceramics and glass cookware like Pyrex) can’t be recycled as it can cause weaknesses in other glass products.

Plastic bags can be dropped off at most major supermarkets for recycling, except for bags marked degradable or biodegradable.

**Some recycling tips**
- Check with your local council about what they collect and their preferences for how to recycle materials in kerbside recycling bins. For example, some facilities prefer you to leave lids on containers while others prefer you to leave them off.
- Always put the items into your recycling bin loose; not in a plastic bag. Everything inside a plastic bag will be sent to landfill. Plastic bags can also tangle up the machinery used to sort the recycling materials.
- Plastic bags marked as biodegradable should only be placed in your compost. They won’t break down in landfill and shouldn’t go into recycling bins.
- Flatten boxes but don’t bundle items together.
  - Place items loose in bins.
  - Roll aluminium foil into a ball and place it in a recycling bin, even if it has food stuck to it.
  - If you run out of room in your recycling bin, ask a neighbour if they have spare room in theirs or make a trip to a recycling centre yourself. In some areas you’re able to request an additional recycling bin for a small annual fee.

**Aluminium and steel**

Aluminium is a common metal and is used widely in cans and for food-related products like foil and pie trays.

Making aluminium uses so much energy that aluminium is sometimes called ‘frozen electricity’.

However, aluminium can be recycled very easily, and many times over. That’s why it’s so important to recycle as much aluminium as possible. Even aluminium with food scraps stuck to it can be recycled.

When recycling steel cans, it’s best to put the lid inside the can and then squash the top of the can before placing it in your recycling bin. If you’re not sure if an item is made of steel, you can use a fridge magnet to test it. If the magnet sticks, it’s made from steel.

**Paper**

Paper and cardboard can be recycled and used again in other paper products. The more we recycle paper and cardboard, the less we need to use natural resources like fibre from trees to manufacture new products. It also uses less energy and water in manufacturing.

When you’re buying paper or cardboard products, look out for items that contain a high percentage of Australian recycled fibre or are made with fibre content from sustainably managed sources, such as plantations or sustainably managed native forests. Australian paper manufacturers have to meet environmental production standards which may not have to be met in other countries.

Paper and cardboard can be recycled through kerbside recycling. Check with your local council to see if there are facilities in your area to recycle larger items (such as removalist or large boxes) or check Planet Ark’s RecyclingNearYou (www.recyclingnearyou.com.au).

**Plastics**

Plastics are man-made products that come from valuable non-renewable resources like oil, gas and coal. Because these resources are so valuable, and because plastics can be effectively recycled and used again in many other ways, it’s important that we recycle as much plastic as possible.

Plastics are generally recycled through kerbside recycling programs. However, some supermarkets now offer a drop-off point for recycling soft plastics such as shopping bags, pasta and rice bags, and biscuit packets.

See the plastics page on the website and Planet Ark’s RecyclingNearYou for more information on how and where to recycle plastics.
Recycling centres

Depending on where you live, it’s possible to recycle a range of products that can’t go in your kerbside recycling bin, including:

- Old mobile phones, printer cartridges, televisions and computers (known as e-waste)
- Whitegoods (for example, fridges and washing machines)
- Cooking and motor oils
- Chemicals and paints
- Batteries (including car batteries)
- Portable gas bottles
- Tyres
- Metals
- Building materials (including window glass, bricks, wood and concrete)
- Polystyrene
- Toys, clothing and soft furnishings
- Bicycles
- Furniture.

Check with your local council to find out if there’s a recycling depot near you, or check Planet Ark’s RecyclingNearYou. Ask what they will accept for recycling and if they collect larger items.

Some of these items, if in good condition, can also be recycled through your local charity or second-hand shop.

Recycling organic materials

Some local councils collect organic waste from your home and turn it into compost. Organic waste includes fruit and vegetable scraps, lawn clippings and garden waste. Contact your local council for a list of materials that can and can’t be included in organic waste collections.

Composting helps keep organic waste out of landfill where it rots and generates methane, a greenhouse gas that is particularly damaging to the environment.

If you have a garden and you have enough space, you could compost your own organic matter or get a worm farm. You can then turn your food waste into free fertiliser to improve your garden soil and feed your plants. Even if you live in an apartment, you may be able to have a small worm farm on your balcony or in your garage.

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Even if you were part of the generation of Australians who had ‘reduce, reuse, recycle’ drilled into you during the last decade – recycling can be hard to do. It’s not always clear what can and can’t be recycled in your local council area.

Even if you were part of the generation of Australians who had ‘reduce, reuse, recycle’ drilled into you during the last decade – recycling can be hard to do. It’s not always clear what can and can’t be recycled in your local council area.

For recycling plastics, we’ve put together this handy guide – but what about recycling beyond your yellow bin? Here are the best tips for recycling all that you can.

1. ‘Green’ polypropylene bags, and plastic packaging that you can’t recycle at home, such as biscuit packets, bread bags, rice and pasta bags, can all be recycled in the dedicated bins at both Coles and most Woolworths supermarkets. They might even be remade into things like garden benches for schools.

2. Mobile phones (but not cables) can be left at Sony Centres and Leading Edge Computers. Here, mobile phones are recycled and the money raised will be used to build specialised youth cancer centres for 15 to 30 year old cancer sufferers through the charity YouCan.

3. Domestic batteries can be disposed of sustainably in bins at most ALDI stores. Learn more from our friends at Planet Ark.

4. Used stamps are accepted as donations by many organisations – for example, Guide Dogs in Tasmania. You can find a full list of organisations who collect used stamps at the Give Now website.

5. Used prescription glasses and sunglasses can be donated to OPSM or Personal Eyes, who will pass them on to someone who can’t afford glasses in a developing country.

6. Unused mini shampoos, soaps and lotions from hotels can be given to your local homeless shelter or women’s refuge.

7. Corks from wine or champagne bottles might be recyclable at a location near you. Use Planet Ark’s RecyclingNearYou tool to find a drop-off point.

8. Used bras and swimwear can be donated to Project Uplift, which sends them on to women for whom bras are unobtainable or unaffordable. You can find participating stores across Australia at the Project Uplift website.

9. Wire clothes hangers can be returned to dry cleaning shops.

10. Joggers that are not too worn can be given to Soles for Souls who will donate them to orphanages or use them to help fund microfinance projects in developing countries.

11. Used plastic children’s toys in good condition can be recycled with Second Chance Toys.

12. Empty toothpaste tubes, brushes, floss containers, some coffee capsules can be recycled with Terracycle. Just remember to check in and arrange it with them first.

13. Printer cartridges can be recycled at Officeworks, JB HiFi, Australia Post, Harvey Norman.

Being environmentally conscious on recycling day and sorting your rubbish into compost, recycling and general waste bins is fantastic – but it’s important to think about producing less rubbish to begin with.

To help consume less ‘stuff’, try asking yourself these three questions when you’re buying something new:

1. What resources went into creating, producing, packaging, and delivering this product to me?

2. Will my use of this product achieve a good return on investment for those resources?

3. Is there another way? Do I already have something like this at home? Could I borrow this from someone I know? Is there a less resource-intensive alternative? Could I buy this second-hand? Could I make this out of something I already have?


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According to the Australian Bureau of Statistics, every Australian contributes around two tonnes of waste each year – a mixture of household garbage and industrial waste created by things we buy or use. It’s becoming more difficult and expensive to find new refuse tips for waste.

Waste disposal is a major issue for the government and the community. By minimising waste by avoiding and reducing waste, and reusing and recycling, we can cut waste by up to 50 per cent – and even more if we compost.

Reducing waste also reduces litter. Remember, everything dropped can find its way to beaches, roads, waterways, bushland and parks through the stormwater system.

If each person changes the way they think and act, the production of waste can be reduced.

With only 77% of newspapers and 18% of plastic packaging recycled in Queensland, there is room for improvement in our recycling.

**Reduce** – Avoid waste – look for ways to produce and use goods that stop waste being generated. Reduce waste – choose products that can be used productively, recycled locally, and have minimal packaging.

**Reuse** – Reuse containers, packaging or waste products.

**Recycle** – Recycle waste material into useable products.

For waste that can’t be avoided, reused or recycled treat the waste to make it less hazardous or reduce the volume of the hazardous component. Dispose of the waste safely.

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**REDUCE**

Want to help the environment? The most effective way is to reduce your waste before it becomes rubbish.

- Become informed about the environmental impacts of products. If not satisfied, search for better alternatives
- Bulk buy when possible, but don’t buy more than can be used
- Choose products with less packaging
- Choose products with recyclable or reusable packaging
- Carry reusable shopping bags or boxes
- Say ‘no’ to unnecessary plastic bags and other packaging
- Reuse plastic bags and all types of containers over and over again
- Buy quality goods that will last
- Encourage manufacturers to play their part.

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**REUSE**

- Look for products in reusable, refillable or recyclable packaging when shopping
- Donate unwanted clothing, furniture and white goods to charities
- Enquire if goods can be repaired rather than replaced
- Hold a garage sale
- Use rechargeable batteries rather than single-use batteries and ask the local council about how to dispose of batteries properly
- Use retreaded tyres if they are appropriate
- Use glass bottles and jars, plastic bags, aluminium foil and take away food containers over and over again before recycling or disposing of them
- Carry lunches in a reusable container rather than disposable wrappings
- Reuse envelopes and use both sides of paper.

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Buy recycled goods

Recycled goods have already saved resources and raw materials and helped reduce the overall quantity of waste.

Remember, ‘recycled’ means the product is made partly or wholly from recycled materials and ‘recyclable’ means the product is capable of being recycled. If an effort isn’t made to buy recycled goods, it’s not really recycling.

Reduce energy and water use

Reducing waste also means saving resources. Energy Information Centres can give information on reducing energy consumption in the home by switching to high-efficiency fluorescent light bulbs, using cold water for washing, and cooking efficiently.

Large amounts of water can be saved at home by fixing leaking taps, using dual-flush toilets, running washing machines and dishwashers only when full, turning the tap off while cleaning teeth, and using a control nozzle on the hose when washing the car or the dog. Design gardens to be water-efficient.
Recycling recovers materials used in the home or in industry for further uses. Only recycle after trying to reduce and reuse.

**Why recycle?**
Recycling has environmental, economic and social advantages.
- Recycling generates civic pride and environmental awareness
- Recycling helps prevent environmental pollution
- Recycling saves natural resources
- Recycling conserves raw materials used in industry
- Making products from recycled ingredients often uses much less energy than producing the same product from raw materials
- Recycling reduces the amount of material dumped in landfill sites
- Goods are used productively and prevented from becoming litter and garbage.

**How do I recycle?**
Recycling is easy. First, call the local council to find out what recycling facilities exist locally. There may be a kerbside collection system, or a community drop-off system. Kerbside collection of recyclables involves placing recyclables out on the footpath for collection on a set day – just like a normal garbage collection.

Council will provide a recycling container and will detail what can and cannot be included for collection. The usual items include all glass jars and bottles, aluminium and steel cans, PET plastic soft drink bottles and HDPE plastic milk and detergent bottles. It may also be possible to include paper, light cardboard, newspapers and ‘junk’ mail, and milk and fruit juice cartons.

Community drop-off centres require a little more effort. Store recyclables at home and then take them to the drop-off centre. Remember to take boxes and bags home from the drop-off centre to prevent litter, and do not mix any non-recyclables with the recyclables.

- Separate recyclables such as glass, plastic, paper and metal from other rubbish – depending on what your local council will collect
- Do not put recyclables in the bin in a plastic bag
- Recycle kitchen and garden scraps, which can make up almost 50 per cent of garbage, as compost
- Get involved in local school and community recycling schemes
- Keep potentially hazardous household waste such as motor oil, batteries, pesticides and paint out of landfill sites – council will provide information about how to dispose of them safely
- Encourage friends and family to get involved in recycling at home, at school and in the workplace.

**What can I recycle?**
Most items can be recycled, but only when there’s a market for the finished product. So, choose products that foster the recycled market.

**Glass**
100 per cent recyclable. Household bottles and jars are made from a melted mixture of silica (sand), soda ash and limestone. Glass manufacturers can use your old glass in this process.
Multi-fill bottles such as some beer bottles can be rewashed and refilled. Single-fill containers, made of thinner glass, are separated into clear and coloured glass and broken down for cullet (used broken glass).

When recycling glass:
- Recycle all glass containers, not just bottles
- Rinse containers
- Remove contaminants such as lids, corks and caps – labels can remain
- Sort glass into refillable and recyclable (check message on bottles to see which type they are)
- Find out if local schools or community groups collect glass for fundraising
- Take glass to collection points or support kerbside schemes
- Place only glass in bins – contaminants such as ceramics, china plates and cups can ruin a batch of glass because they melt at a different rate to glass and can weaken the recycled glass.

**Plastic**
More than 60 types. New plastics and uses, constantly being developed.
Different types of plastic must generally be kept...
separate for recycling. The Plastics Industry Association has introduced a voluntary system of product coding to help recyclers and the public.

- PET Polyethylene Terephthalate
- HDPE High Density Polyethylene
- UPVC Unplasticised Polyvinyl Chloride
- PPVC Plasticised Polyvinyl Chloride
- LDPE Low Density Polyethylene
- PP Polypropylene
- PS Polystyrene
- EPS Expanded Polystyrene
- Includes all other resins and multi-materials (e.g. laminates).

The two types of plastic most commonly recycled in Queensland are PET (polyethylene terephthalate) and HDPE (high density polyethylene). PET is commonly used for soft drink packaging (the rocket bottom bottle) and HDPE is used to make plastic milk and detergent bottles. Other types of plastic can be recycled, but are not recycled in the same quantities.

When recycling plastic:
- First, reuse plastic containers and bags
- Sort plastic into different types – follow the instructions at the drop-off centre or the instructions provided for kerbside collection
- Rinse containers and remove lids (lids are often a different type of plastic)
- Ask the supermarket to recycle plastic bags
- Look for the code number on any plastic item and try to choose those which can be recycled in local recycling programs.

Aluminium
Can be recycled over and over again.
Much energy is used to produce primary aluminium from bauxite. Once in metallic form, aluminium can be recycled indefinitely.
Recycling aluminium uses only five per cent of the energy needed to produce new aluminium. This saves coal in energy production in power stations and reduces emissions to the atmosphere.

Around Queensland, sell cans at ‘Cash for Cans’ and ‘Cash-a-Can’ centres or put them in kerbside collections or drop-off centres. Find out if local schools collect cans for fund raising.

Currently, the industry recycles 55 per cent of the steel cans Australians use every year.

When you recycle aluminium:
- Place aluminium cans in a recycling bin, not the wheelie bin
- Encourage schools or workplaces to recycle aluminium cans
- Remove foreign objects (e.g. straws) that could ruin new aluminium.

Other metals
Metal recycling has been around for centuries.
Salvaging and reusing metals such as lead, copper and steel makes economic sense.
Metal recycling also makes environmental sense. Processed metals and many alloys require less energy to recycle than to mine and process. This conserves our raw material resources for the future.

Lead can be recycled from old car batteries. Service stations and car battery retail outlets will generally accept car batteries for trade-in, or take them to a metal recycler for recycling. Do not empty out battery acid before delivering the batteries to a collector.

Don't throw away copper from hot water systems, copper pipes or old car radiators – take them to a scrap metal dealer. Electric cabling and wiring contains copper and aluminium, which can be recycled. The plastic coating found on some wiring can be removed by metal recyclers in a process called ‘granulation’. Using this process, the plastic is removed and the copper, aluminium and any steel present are separated magnetically for recycling.

Brass retrieved from old household fittings can be restored for use in old houses.

Steel and iron can be reclaimed from car bodies and engines, disused household or industrial equipment and building materials. Most household steel scrap is in the form of human and pet food cans. Scrap metal dealers may take clean, de-labelled cans but may not be able to offer payment for them. Steel cans, including aerosol, are accepted in many kerbside recycling programs.

When you recycle metal:
- Take it to a scrap metal dealer or local drop-off centre
- Ask if money is paid for for returned metal goods
- Remember that old car bodies and old fridges and freezers look better in a scrap metal yard than dumped in bushland
- Don’t include fire extinguishers, gas bottles, or shock absorbers – they have the potential to explode.
Paper

Plantation timber, not native forests, is the source of most paper-making pulp. Stronger, better quality paper is made from hardwoods. Softwoods produce shorter fibres suitable for paper such as newsprint.

Good quality paper is in demand with recyclers to produce a variety of recycled paper products such as printing and writing paper, office supplies such as envelopes, toilet paper and tissues. Lower grade paper is usually used to make products such as cardboard and insulation.

Demand for old newspapers can fluctuate. The short fibres in newsprint make it unsuitable for recycling uses other than packaging material, insulation material or being recycled back into newsprint.

When recycling paper:
- Make two-sided copies, use the blank side of used paper for notepaper before recycling, and reuse envelopes
- Set up an office paper recovery scheme to separate good quality office paper for further uses in areas where local markets or collection services exist
- Use recycled paper where possible.

Your role

At home
- Check that purchased products are the best choice for the environment (for example, does it save energy, conserve water, does it have recyclable content?)
- Reject unnecessary packaging
- Reuse packaging
- Sort rubbish
- Use local recycling depots or kerbside services
- Compost kitchen and garden waste
- Choose recycled goods whenever possible.

At school
- Educate children to be responsible consumers and recyclers
- Promote litter control
- Educate parents and teachers
- Support or initiate school recycling schemes.

At work
- Press for more efficient use of resources such as energy and office paper
- Become informed about the potential for waste minimisation and recycling in workplaces
- Publicise issues through staff newsletter
- Initiate a recycling scheme.
REDDUCING WASTE

Although we've made great improvements in our waste disposal habits over recent years, there are still lots of ways we can do more, according to this advice from Your Energy Savings website.

On average Australians throw away around 21 million tonnes of waste per year. This includes waste from our kitchens, bathrooms and laundries and our gardens. It also includes building waste generated from building and renovating our homes.

Although we’ve made great improvements in our waste disposal habits over recent years, there are still lots of ways we can do more.

Becoming more aware of waste

The first step to reducing household waste is to rethink our assumptions about what waste is. If we shift our thinking about the lifespan of products that we use and the lifecycle of produce that we consume, we can make landfill a last resort.

The next step is to become more aware of how we create waste and the variety of ways we can reduce, reuse and recycle. Nothing is waste – until we throw it away.

By refusing excess packaging or making a decision not to purchase things brand new, we can reduce the amount of unnecessary waste sent to landfill.

Recycling and reusing products also has a big impact on reducing waste. Look for ways to recycle, or pass unwanted items onto friends or charities. One person’s waste is another person’s gain.

Find out about recycling in your area. Contact your local council to find out what services exist and what they do and don’t collect. This will help make sure your recycling doesn’t end up in landfill. You can also find recycling facilities at Planet Ark’s RecyclingNearYou (www.recyclingnearyou.com).

Buying products that can be recycled or contain recycled materials helps to keep metals and other useful materials out of landfill. This can also reduce the demand for manufacturers to make new materials.

Whatever waste we produce should be disposed of correctly. Take advantage of your local council’s garbage and recycling services. Some councils offer ‘green’ collection services where you can dispose of garden and lawn clippings to be recycled.

Organic waste

Around two thirds of waste sent to landfill is from organic material like food scraps, paper and garden waste. When organic waste decomposes in landfills, it produces a gas known as ‘landfill gas’ which consists of about 55 per cent methane. Methane is a much more damaging greenhouse gas than carbon dioxide (CO₂). It’s also smelly and highly flammable.

Most major landfill sites in towns try to capture landfill gas which can be used to generate energy. Australian landfills captured 26 per cent of landfill gases in 2005-2006.

Organic material sent to landfill would be better composted at home or dropped off to your local green waste recycler. Check with...
your local council or Planet Ark’s RecyclingNearYou to find out about organic waste facilities in your area.

**Chemical and hazardous waste**

We use a range of chemical products in our daily lives – in our bathrooms and laundries, in the garden and in the kitchen. Chemicals provide us with many benefits, but it’s important to use, store and dispose of leftover chemicals and other hazardous household waste properly to prevent health and environmental problems.

These hazardous products can’t be disposed of in your regular garbage collection; you need to take them to a hazardous waste collection facility. Check with your local council or Planet Ark’s RecyclingNearYou for collection services available in your area.

You may be able to reduce the number of toxic products you throw out by thinking about and changing your shopping habits. You may also be able to reuse or recycle many chemical products.

**Building material waste**

Up to 40 per cent of waste that goes to landfills in Australia comes from building material waste; so actions we take to minimise building waste can have an enormous impact. When building or renovating, it’s important to plan carefully, build only what you need, select your materials carefully and reuse or recycle wherever possible.

**Electronic waste (e-waste)**

Electronic waste or e-waste includes electronic products that we no longer want such as computers, televisions, home entertainment systems, printers, faxes and mobile phones.

As Australians buy more and more electronic products, the amount of e-waste is increasing rapidly. This waste contains many parts that can and should be recycled so that the resources can be used again. E-waste also contains a range of hazardous elements such as lead and mercury which can be released into the environment if not disposed of properly.

**Packaging**

Packaging makes up a significant part of the rubbish in landfill. If you can buy in bulk, you can save money, packaging and transport costs. If not, you could try to choose products that use less packaging.

Reducing the amount of disposable products you use makes a big difference to your overall level of waste.

Refusing plastic bags when you don’t need them saves resources and energy used to manufacture the bags. You’ll also reduce the amount of waste that ends up in landfill.

Remember to take your reusable bags out with you so you can refuse plastic bags.

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The first step to reducing household waste is to rethink our assumptions about what waste is. If we shift our thinking about the lifespan of products that we use and the lifecycle of produce that we consume, we can make landfill a last resort. The next step is to become more aware of how we create waste and the variety of ways we can reduce, reuse and recycle. Nothing is waste – until we throw it away.
Say NO to plastic bags

CLEAN UP AUSTRALIA EXPLAINS HOW WE CAN AVOID THE USE OF PLASTIC BAGS

Plastic bags are everywhere, and while they are convenient, they cause significant environmental damage all over the world. Every year Australians consume more than 4 billion supermarket plastic bags. Of these, just 3 per cent are recycled and the rest end up in our environment or in landfill.

THE PROBLEM WITH PLASTIC BAGS

Types of plastic bags

HDPE bags – high density polyethylene ‘singlet’ bags are the thinner bags used by over 80% of retailers, but predominately in supermarkets. These bags are easily recycled, yet rarely are.

LDPE bags – low density polyethylene bags are the much thicker bags used by boutiques and department stores. These bags are recyclable, although there are few collection points.

The environmental impact of plastic bags

A plastic bag on the beach, in a tree or blowing down the street is a very unattractive, yet common sight. Moreover, because plastic bags don’t go away, they just break up into smaller and smaller pieces of plastic, the number of plastic bags in the environment continues to accumulate, with 80 million littered per year. Plastic bags are lightweight and moisture-resistant, which means that they float easily in air and water, often travelling long distances.

Threat to marine life

Every year over 6 million tonnes of rubbish is dumped into the world’s oceans, 80% of which is plastic, and a further 10% of this being plastic bags. With an estimated 46,000 pieces for every square mile of ocean, plastic is responsible for killing 1 million sea birds and over 100,000 sea mammals each year. Turtles, whales and sea birds mistake rubbish for food or get entangled in it, resulting in painful injuries, or even death.

Landfill space

Australians dispose of an estimated 4 billion plastic bags, or 20,700 tonnes of plastic, that can be recycled. Even plastic bags that are reused as bin bags end up in municipal waste streams and will never be recycled, filling our already limited landfill space.

DID YOU KNOW?

- Plastic bags can be returned to your supermarket for recycling but only 3% are currently recycled.
- So-called ‘biodegradable’ bags actually cause greater widespread pollution than regular plastic bags.
- Australians currently use 4 billion plastic bags annually, which means over 10 million new bags are used every day.
- The energy consumed in the life cycle of one plastic bag is estimated to be equivalent to 13.8 millilitres of crude oil, or about a teaspoonful.
- Australians throw away about 7,150 recyclable plastic bags a minute, with 429,000 recyclable plastic supermarket bags dumped into landfill every hour.
- Plastic bags can become serial killers. Once a bag is ingested, the animal dies and decomposes, releasing the bag back into the environment to kill again.

DISPOSAL OF PLASTIC BAGS

Recycling, 3%
Landfill disposal, 36%
Reused before landfill disposal, 60%
Litter, 0.80%
**Greenhouse gases**

When gas, oil and coal are used to produce plastic bags, they emit dangerous greenhouse gases. Large amounts of plastic end up in landfill, also a significant source of greenhouse gases.

**Clean up costs**

It is estimated that it costs governments, businesses and community groups over $4 million per annum to clean up littered plastic shopping bags.

**THE SOLUTION**

**Say NO to Plastic Bags Campaign**

Clean Up Australia is committed to getting rid of lightweight plastic shopping bags. ‘Say NO to Plastic Bags’ brings individuals, the community, businesses, government and environmental groups together to ‘Refuse, Reuse and Recycle’ plastic bags.

**What you can do today**

**Refuse**

- If you are buying only a few items, consider carrying them.
- When shopping, take re-useable alternatives like ‘green bags’, bags out of long lasting washable non-plastics or baskets with you.
- Make sure that you keep these bags in the car or put your car keys in your reusable bags at home so you don’t forget them.
- Consolidate purchases into one bag rather than getting a new bag in each store.
- Remember, the thicker bags are not easily recyclable so avoid taking them, where possible.

**Reduce**

- Count the number of plastic bags that you use and aim to reduce that number each week.
- Avoid putting items with handles into a bag, e.g. dog food or nappies.
- Avoid using small plastic bags as bin liners. Simply put the household rubbish straight into the bin, lay it out with newspaper first and rinse afterwards, use the rinse water in your garden.

**Reuse**

- If you can’t avoid a plastic bag, reuse it to freeze food, store clothing or while walking your dog.
- Keep a spare reusable shopping bag in your handbag or wallet. Choice 2010 survey found 62% respondents use reusable bags for shopping.

**Recycle**

- Find a local supermarket that offers recycling facilities for plastic bags.
- Return your plastic bags with the driver if your shopping is delivered.
- Ensure that your bags are free from contamination (food scraps or receipts), to aid the recycling process.

Plastic bags don’t go away, they just break up into smaller and smaller pieces of plastic ... the number of plastic bags in the environment continues to accumulate, with 80 million littered per year.

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PLASTIC IS NOT ALWAYS FANTASTIC

We love to hate it, but still it seems like plastic is here to stay, for now (and the next million years). Jeroen van Kernebeek takes a look at what we can do to make our plastic lives a little less pervasive.

Plastic. If you’re anything like me you hate the stuff. And if you don’t yet, Chris Jordan’s compelling photographic arts will probably do the trick. But in our modern world it’s hard to escape – it is literally everywhere and it’s probably the material you touch most often every day, unless you’re a woodlouse.

Some people take the laudable challenge to live plastic free head on, but for most of us, a plastic-free life is just not on the cards. So what can we do? The famous three Rs (reduce, reuse and recycle) can go a long way in reducing the negative impact of plastics on our environment.

But even following the three Rs, you’ll probably find plastics are your dominant waste (except for food if you don’t have a compost). Single use shopping bags, bread bags and other food packaging, magazine and newspaper wrappings all end up in the bin.

This is a sad situation when you consider that every single piece of plastic created to date, even if long discarded, is still around in some form or another, many in tiny invisible toxic particles. With an estimated 1 trillion plastic shopping bags alone being discarded globally every year, or 7,150 every single minute in Australia, that adds up to a massive problem.

At long last Australia has a scheme to recycle soft plastics and it’s very easy for everyone to take part.

With an estimated 1 trillion plastic shopping bags alone being discarded globally every year, or 7,150 every single minute in Australia, that adds up to a massive problem.
At long last Australia has a scheme to recycle soft plastics and it’s very easy for everyone to take part. All you need to do is keep them separate at home and drop them in the Redcycle collection bins at Coles stores.

REDcycle will ensure that your plastics will get a second life as durable outdoor furniture such as boardwalks for parks and benches for schools. It will save trees and toxic paints that would otherwise be needed to protect wooden outdoor furniture from rotting.

Taking part in REDcycling is just a small way to green our lives. But every little bit is important and there are so many other minimal-effort-no-cost ways to do our bit.

Here are just 3 ideas:
1. Cancel your Yellow Pages in just 1 minute. It saves a brick of a book every year (and the plastic wrap).
2. Put a No Junk Mail sticker on your mail box. Just call your council – most provide stickers for free.
3. Take 3 pieces of rubbish from the beach, park or gutter whenever you are out and about. It’s a great feeling to leave a place a little bit better than you found it.

And if you’re an armchair activist like me, you can write to your premier to demand a container deposit scheme that would see millions of plastic and glass bottles and aluminium cans recycled instead of dumped.

In his comedy act, *Take your canvas bag (to the supermarket)*, Tim Minchin draws people’s attention to the plastic problem using humour. For me this song really hit home the message that everybody can drive change.

Your individual actions may not save the world overnight, but they do set an example to others that we can all do something to protect our environment. This in turn can drive a change in social attitudes needed to tackle the big environmental issues.

From little things, big things grow!

E-WASTE

Clean Up Australia cautions in this fact sheet that electronic waste is one of the fastest growing contributors to our waste stream. As more and more outdated electronic equipment ends up in landfill, the negative impacts of e-waste on the environment and humans will increase.

THE PROBLEM

Electronic waste can come in many forms including computers, photocopiers, printers, faxes, monitors, batteries and mobile phones.

Why it is a problem

Some of these items can be highly toxic and environmentally damaging.

The following harmful substances can be found in everyday e-waste:
- Lead in cathode ray tubes and solder
- Mercury in switches and housing
- Arsenic in cathode ray tubes

Did you know?

- 88% of the 4 million computers and 3 million TVs bought in Australia every year will end up in landfill.
- Fewer than 1% of the TVs and around 10% of PCs and laptops are recycled Australia-wide.
- Of 16.9 million TVs discarded each year, only 6.3 million are recycled.
- Electronic waste is responsible for 70% of the toxic chemicals such as lead, cadmium and mercury found in landfill.
- E-waste is being sent to landfill at three times the rate of general waste.

- Antimony trioxide as flame-retardant
- Selenium in circuit boards
- Cadmium in semiconductors
- Cobalt in steel for magnets.

E-waste and the environment

When e-waste is sent to landfill, poisonous substances can leach from decomposing waste and into the environment. These substances can seep into groundwater, contaminate the soil and enter the food chain.

When e-waste is sent to landfill, poisonous substances can leach from decomposing waste and into the environment. These substances can seep into groundwater, contaminate the soil and enter the food chain.

E-waste and people

There is a risk that humans may develop health problems by coming into contact with the toxins. These include respiratory ailments, reproductive, developmental and nervous system problems.

E-waste: a growing problem

In 2013, there was an estimated 268 million tablets and 1.4 billion smartphones worldwide.

Electronic waste is piling up around the world at a rate of 40 million tonnes per year.

WHAT YOU CAN DO TO BE PART OF THE SOLUTION

Although it is unavoidable for electronic equipment to eventually become redundant, you can follow the below tips on minimising the impact your home or office e-waste has on the environment.

Additional categories: lighting equipment (fluorescent tubes); toys, sports and recreational equipment; electric and electronic tools (drills, sewing machines, lawn mowers, etc); surveillance and control equipment; medical instruments; automatic ticket machines.

Most types of e-waste contain many valuable resources that can be recovered and reused. Often much less energy is needed to recover these resources than to produce new materials.

Most types of e-waste contain many valuable resources that can be recovered and reused. Often much less energy is needed to recover these resources than to produce new materials.

**Avoid**

- If you decide to buy any new equipment, ask the manufacturer about reuse and recycling options and avoid those that do not.
- Avoid disposable products. Only buy products that are durable, repairable and have a good warranty.
- Consider leasing equipment that can be returned to the manufacturer when it is no longer needed.
- Engage service providers who replace and refill components of leased equipment when they have been used.
- Toners and some inks are now being produced with biodegradable oils such as soybean oil, which are much less toxic than petroleum-based toners and inks.

**Reduce**

Where economically feasible, repair machinery, appliances and equipment in preference to purchasing new equipment.

**Reuse**

- Check around local schools/charities to see if they can use your surplus appliances.
- There are many companies that will refurbish your old computer equipment for use by those who cannot afford new items.
- Many ink cartridges can be refilled with ink for reuse using toner refill kits.
- Alkaline batteries can be recharged.

**Recycle**

- Take electrical goods and scrap such as copper wiring to electronic recyclers.
- Cathode ray tubes of televisions and computer screens can be recycled.
- Visit the e-waste section of [www.cleanup.org.au](http://www.cleanup.org.au) for a list of e-waste recyclers in your state.
- Most councils provide e-waste recycling services or know of local businesses that do. Contact them if you are in doubt on what to do with your e-waste.

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MINIMISE FOOD WASTE

It makes perfect sense to become waste-wise in the kitchen and rethink the way we shop, according to this information reproduced from the website, Your Energy Savings.

In Australia we waste up to 30 per cent of the food we purchase. That’s a great waste of money, and it also has a negative impact on the environment. In NSW alone, the average household wastes up to 315 kilograms of food a year, at a cost of just over $1,000.

Every time we throw food into the bin we’re wasting our money and also discarding the vast amounts of resources, energy and water that it took to produce, process, store, refrigerate, transport and cook our food. So it makes perfect sense to become waste-wise in the kitchen and rethink the way we shop.

- Save money
- Reduce energy, water and resource use.

At a glance:  Savings 3   Ease 3   Impact 3

TAKE ACTION

Shop wisely

Much of the food wastage in our kitchens comes from simply buying too much or inadequate planning.

To reduce the amount you throw away:

- Check what’s in your fridge before you go shopping and plan your next meals around what needs to be eaten. Don’t forget to look at the back of the shelves and in those hidden corners. Put things in the freezer if you aren’t able to eat them soon.
- Before you go shopping, think about what you will eat for the next few days and make a list of what you need. This will help you to buy only what you need – minimising food waste and saving you money.
- Remember to take your reusable shopping bags.
- Buy in quantities that you will use.
- Keep a store of long-life basics in your cupboard – like pasta, rice, tinned fish or beans or frozen vegetables. This makes it easy to prepare a quick meal when you add a few fresh ingredients.
- Check use-by dates to make sure you will eat the product before it goes out of date. Try to include local or organic food in your shopping. This helps reduce emissions from transport as well as the use of chemicals and fertilisers.
- When purchasing fish, choose species which are not overfished or threatened. Ask your seafood retailer for advice.
- Try to select food with minimal packaging to reduce waste to landfill.
**Store food correctly**

Different foods have different storage needs. Correct food storage has a huge impact on the freshness and shelf-life of food.

- Keep your food fresh and avoid wasting energy by having your fridge set at the right temperature – between 3 and 4 degrees Celsius for the fridge and between minus 15 and minus 18 degrees Celsius for the freezer. Use a fridge thermometer to check.
- Keep a range of air-tight plastic containers for storing various foods once they have been opened or cooked. Keep old margarine and takeaway food containers including their lids for this purpose.
- Air-tight jars (like jam jars) are great for storing dry ingredients like flour or rice or leftover liquids.

**Here are some tips for storing food:**

- Most vegetables keep best in the refrigerator – in the vegetable keeper if you have one. Once cut, vegetables are safest stored in the fridge.
- Remove vegetables, herbs and mushrooms from plastic bags as they will ‘sweat’ and spoil.
- Store potatoes, onions and other root vegetables in a cool dry place. If your potatoes turn green, don’t eat them – put them in your compost or worm farm.
- Refrigerate raw meat immediately after purchase until cooked. Keep meat in a sealed container so it doesn’t contaminate other food. Store it in the coldest part of your fridge (usually at the rear).
- Store opened pasta, rice and cereals and other dry ingredients in air-tight plastic containers.

For lots more tips on how to choose and store different foods visit the Food Safety Information Council website, [www.foodsafety.asn.au](http://www.foodsafety.asn.au)

**Use your freezer**

If you’re trying to reduce food waste, your freezer can be your best friend in the kitchen. Use it to store food that would otherwise go off.

- Use your freezer to store leftovers for a later lunch or single meal. Do not reheat more than once.
- If you’re cooking a curry or stew, cook extra and store some in the freezer for an easy meal later on. Remember to thaw items in your fridge overnight rather than in the microwave.
- If you are unlikely to use a whole loaf of bread before it goes stale, cut it up into portions and store it in the freezer.
- Lots of fruits and vegetables are suitable to freeze. You can blend frozen strawberries or raspberries into a smoothie or use it as a topping. Freeze bananas (without the skin) that are getting very ripe, these are great for baking or eating.
- You can even freeze some cheeses like parmesan or gruyere.
- Freeze liquids like stock and even wine in small containers or in an ice cube tray and use as needed in cooking.

Every time we throw food into the bin we’re wasting our money and also discarding the vast amounts of resources, energy and water that it took to produce, process, store, refrigerate, transport and cook our food.

**Cook what you need**

Try to cook only as much as will be eaten. A portion guide may help you to work out how much to cook for each person. If you have extras every night, adjust the amount you cook.

**Use leftovers**

Get inventive with leftovers and put even small leftovers in the fridge or freezer for a handy lunch or snack. There are plenty of websites with new and traditional recipes that make use of leftovers to provide nutritious and delicious meals.

- Keep leftovers for lunches or snacks, or as part of another meal.
- If you can’t use leftovers straight away, freeze them for later. Don’t reheat leftover food more than once.
- Be creative and invent your own recipes from what’s in the fridge. You can search for recipes online by key ingredients.
- Keep scraps for pets. Make sure the food is suitable – for example, onions are toxic to dogs.
- Chickens will dine on a variety of kitchen scraps. They’ll also provide fresh eggs, pest control and garden services.
Refuse and reuse packaging

The majority of packaging that comes with your food can be avoided or recycled. Here are some ways you can reduce or reuse packaging:

- Refuse excess packaging. Look out for products with less outer materials.
- Fruit and vegetables come in their own packaging and rarely need to be put into separate plastic bags for purchase.
- Recycle packaging where you can and reuse containers. Plastic take-away containers from restaurants can be used for storage or as a lunch box, and margarine containers are great for paint holders if you’re renovating.
- Take your own bags when you go shopping.
- Pass on egg containers to friends or colleagues who keep chickens. The cardboard can also be ripped up and used in your compost.

Recycle waste

Plastics, tins, paper and cardboard and drink containers can all go in your home recycle bin. Check our recycling guide and make sure you know what your local council does and does not collect. Bottles can be recycled and don’t forget the corks from your wine bottles.

Cork is a valuable natural resource. Find out where you can recycle cork stoppers from wine bottles through Planet Ark’s RecyclingNearYou (www.recyclingnearyou.com).

Compost food scraps

You can turn food scraps into compost for your garden to reduce waste and return nutrients to your soil.

You can compost most types of food waste including:

- Uncooked vegetables and scraps
- Fruit
- Salad
- Tea bags
- Crushed egg shells
- Coffee grounds
- Non-food materials such as plants and flowers, grass clippings, leaves and shredded paper, cardboard or pet and human hair.

It is not recommended that you put the following items in your compost as they do not break down quickly and can attract animals or vermin:

- Dairy products
- Meat or fish
- Lemon or orange peels.

Keep a small container for food scraps handy in your kitchen and empty it regularly into your compost bin.

Cut up large pieces of food scraps as they will break down more quickly.

Start a worm farm

You can also recycle food waste by turning it into rich fertiliser through a worm farm. Worm liquid and castings are excellent for pot plants or can be given to neighbours with gardens in exchange for fresh vegetables.

You can have a worm farm even if you live in an apartment and don’t have much space. There are clever worm farm kits that fit under your sink or on your verandah so they’re convenient, space-efficient and clean.

While worms aren’t fussy eaters, you shouldn’t feed them:

- Dairy produce like butter or cheese
- Meat or fish
- Fat or bones
- Onions or garlic.

Grow your own food

Growing your own fruit and vegetables is a great way of reducing some of the harmful gases produced by processing and transporting food. Not only is growing your own food rewarding – it tastes better too.

Even if you don’t have a garden, it’s easy to grow a few fresh herbs or salad greens in a pot on your verandah or kitchen so they’re always on hand. Instead of buying costly bunches of herbs at the supermarket that you may not use, you can snip off just a few leaves as you need them. The flavour of fresh herbs will give your meals a lift. Consider using organic principles for the food you grow.

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WHAT IS THE CIRCULAR ECONOMY?

We know recycling, but the concept of a circular economy is much broader, according to this article first published in *The Conversation*, written by Suzanne Benn and Damien Giurco

When the who’s who of business and world leaders met at last month’s World Economic Forum in Davos a different industrial model was on the agenda: the circular economy.

It’s a term the average person may not have come across yet, but the idea has gained sufficient traction in business, political and environmental circles to be the subject of a report released at the Forum’s influential annual meeting and to be the focus of an initiative supported by leading companies to encourage business to embrace its principles.

Globally, in the consumer goods sector about 20% of total material value is recovered while 80% goes to waste.

In Europe, the biggest annual conference on environmental policy will this year focus on the circular economy and how to unlock its potential, while China’s latest five-year plan has an entire chapter devoted to efforts to “vigorously develop a circular economy”.

In Australia, various NGOs and academic institutions are already engaged with promoting and developing a better understanding of the model.

As such, the core idea behind the circular economy is not new. There is significant overlap with concepts such as ‘cradle-to-cradle’ design and with industrial ecology, which have been around for decades. But it’s only now that these ideas are becoming more mainstream.

So what is the circular economy and why should Australians care about it? While many may assume it is about recycling, the model involves much more than that.

Currently, the dominant mode of making and using things in our economy involves digging up resources to manufacture products and infrastructure, then discarding to landfill or recycling when we are finished with those materials. This has been dubbed the ‘take-make-dispose’ economy.

Globally, in the consumer goods sector about 20% of total material value is recovered while 80% goes to waste.

In Australia, about half the waste we generate is being recycled but with continued growth in economic output, the volume of waste going into landfill here continues to rise.

In Australia, about half the waste we generate is being recycled but with continued growth in economic output, the volume of waste going into landfill here continues to rise.

Often, we are throwing away valuable resources in this ‘linear’ model. Without change, this can only get worse as three billion new middle-class consumers enter the global market in the next 15 years.

The circular economy addresses these unnecessary resource losses.

How does it do that? More recycling is part of it but the circular economy involves much more. It is a model of industrial production which involves designing products so they last longer, so they can be repaired and upgraded, so they can be reused or resold (on eBay, for
The circular economy addresses these unnecessary resource losses ... It is a model of industrial production which involves designing products so they last longer, so they can be repaired and upgraded, so they can be reused or resold, and so their materials can be used in remanufacture.

example), and so their materials can be used in remanufacture.

It is a more ‘restorative’ process, where components and materials can be reused many times.

This will involve a shift on the part of businesses that are accustomed to generating ongoing revenue via planned or ‘inbuilt’ obsolescence.

One example of the sort of switch that might be involved is for businesses to sell services instead of products – for example, selling ‘hours behind the wheel’ rather than selling cars, which is what happens with car-share schemes such as GoGet, Hertz 24/7 and GreenShareCar.

This sort of change is starting to happen, but the report launched by the WEF and the Ellen McArthur Foundation at Davos last month considered a crucial issue: how to scale up the circular economy model.

Dominic Barton, Managing Director of McKinsey & Co, which collaborated on the report, spelled out the business case. The world economy is $72 trillion in size but applying the circular economy model would lead to at least $1 trillion in savings immediately, he said, and potentially much more in years ahead.

These savings would flow from waste reduction and lower capital requirements for businesses. Other potential benefits include reduced volatility in the price of inputs, along with greater innovation and job creation.

Remanufacturing and recycling in Europe, for example, already employs more than one million people. There, companies such as Renault have found that while remanufacturing is more labour-intensive, reduced waste and lower capital expenses mean profits are maintained.

Project Mainstream, which was launched at Davos, is designed to promote collaboration in pursuit of the circular economy, particularly across the massive global supply networks of key industry sectors. Household names such as Unilever, Cisco, Philips and Renault are some of the global partners with the Ellen MacArthur Foundation in this initiative.

A number of factors will help drive progress towards a circular economy. Businesses will increasingly be motivated to do more with less as water, energy and resources become more expensive in coming decades.

In an era of ‘big data’, we know more about where resources are, which means it will be easier to recover them profitably. New technologies such as 3D printing offer the potential to reduce materials and energy use, and wastage, by allowing products to be produced on demand rather than just in case.

Meanwhile, there is growing acceptance of economic models based on access rather than ownership and this ‘collaborative consumption’ will also help unlock the untapped value of assets.

For Australia, rethinking the productivity of materials holds promise at what is a challenging time for traditional manufacturing. The circular economy offers the potential of job creation and innovation and a pathway to a resilient economic growth.

Suzanne Benn is Chair in Sustainable Enterprise, UTS Business School at the University of Technology, Sydney.

Damien Giurco is Research Director, Institute for Sustainable Futures at the University of Technology, Sydney.

Worldwide garbage production is an ever-increasing problem. Most households in Australia recycle. Still, the Australian Bureau of Statistics says nearly half of our waste goes to landfill. As populations increase, so does the amount of garbage we produce.

Garbage needs to go somewhere. Since the advent of communal living, humans have been dumping, burning, or burying it. Architect Professor Steffen Lehmann is the Head of School of Built Environment at Curtin University in Perth. His research focuses on how to make urban living more sustainable. He says waste management plays a major role.

“Every city you go around the world, whoever you talk to, there is huge issues around how to reduce the ever-increasing waste generation. At the moment, for instance, in Australia we produce around 50 million tonnes of waste. This will increase by 2020 – in five years – to 80 million tonnes of waste per year. And most of it goes to landfill, unfortunately. And that’s just totally unacceptable.”

As cities became larger in the early 20th century, modern landfills were invented. But they occupy valuable land area. They also bury valuable resources.

Kath McLaughlin, Resource Recovery Manager at the City of Sydney, explains.

“Ultimately, when something ends up in landfill, it has no more use to anybody, it can’t be turned into a new product or it can’t be used as energy or anything like that. So it ceases to be useful at all, so we need to make sure that resources are used before it ends up in landfill.”

Professor Lehmann agrees that landfills are unsustainable.

“We lose all the resources – we dig a big hole, we throw it in, and we cover, and it’s under the carpet and we forget about it. Of course, this is not very clever on the long run. We need to be much smarter about our resources, our materials.”

Australians are strong supporters of recycling. The ABS says over 97 per cent of households across the country practise recycling and reusing. But that still leaves almost half of all garbage that ends up in landfills every year.

This includes things like food waste and construction waste, as well as incorrectly disposed recyclables. That amounts to at least 21 tonnes, with volume on a steady increase. Meanwhile, landfill space is not infinite.

Another way to deal with waste is incineration. Burning non-recyclable garbage in specially designed plants produces valuable energy. This practice is popular in Europe, but there is continuous debate about efficiency. Professor Steffen Lehmann advocates against it.
“We do not think that burning of waste has any future. Instead what we should do is the recovery of the resource. If we burn it for a quick gain, and we have energy or heat out of that, the resource is lost forever. It’s much better to recover the resource so it can be reused again and again.”

Experts believe that we need to change our attitude towards garbage. This would mean a move towards a philosophy known as “zero waste.” Several towns and councils in Australia are already working towards this strategy. For example, City of Sydney uses advanced waste treatment to produce a low-grade compost product out of the waste that can’t be recycled.

Kath McLaughlin explains the City of Sydney council’s zero waste campaign.

“We don’t send any of our domestic waste directly to landfill. That way we can recover a lot more resources from the waste treatment. We treat waste as a resource and not as garbage. And we’re minimising the negative environmental impacts of waste, and also the economic costs that go along with that as well.”

Professor Lehmann believes that globally everyone needs to be moving towards zero waste.

“It’s about making sure residents know first it’s best to avoid creating the waste in the first place; if they can’t do that, reuse is the next best option, then, if they can’t do that, it’s up to making sure they recycle their items as much as possible.”

Instead of using once and disposing, a zero waste attitude means thinking differently altogether.

One way to avoid creating waste is to not buy items that will end up in the garbage. An obvious candidate here is disposable packaging. Caique Ponzoni is the owner of Naked Foods, an organic food store chain in Sydney. In his stores there is no packaging at all, except for brown paper bags.

“So the whole concept of this store is to bring your own container, basically. The idea of that is to reduce our wastage of plastic, reduce our waste of packaging, and to reduce our waste of food as well.”

For a modern consumer, this approach can be unusual. But it turns out it can be applied to a lot of products – from nuts and grains to shampoo and detergent.

“Our mind is so well set to shopping at the supermarket these days, then you know we expect to walk into a store and see everything in packaging. So when people walk into here, they go ‘wow, this is amazing.’”

Professor Lehmann supports turning consumers into responsible citizens.

“Firstly it takes the change of behaviour, that we stop buying products we know don’t last long. We need to stop the consumption of products that go straight to landfill after one or two uses. We also need to ask for better products, what’s called extended producer responsibility.”

But even though shops like Naked Foods exist, they are a small minority. Mr. Ponzoni explains that selling products without packaging has challenges, too. Most importantly, it doesn’t keep fresh as long.

‘Product stewardship’ is a concept often talked about when we bring up disposable stuff. Producers of goods are partially responsible for the resources used, and their environmental impact. Since 2011 Australia has national legislation in place addressing this very question.

Product stewardship can be voluntary or mandatory. In practice it means that companies contribute to recycling schemes, or otherwise make sure that the whole life cycle of the product is as environmentally friendly as possible.

According to Professor Lehmann, it is possible to make a move towards the idea of zero waste – if we all do our bit.

“We need companies that understand the extended producer responsibility and stop producing non-recyclable products. Very, very important. Let’s reuse, share, repair, recycle before we send it to landfill. I believe that zero waste cannot be a 100 per cent achieved, but we should always aspire as close as possible.”

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Energy plays a major part in Australians’ lives, with both households and businesses relying on various types of energy for heating, cooling, cooking, transport and machinery operation.

Growth in Australia’s economy has led to increases in energy use, particularly in expanding industries such as the mining industry. Other factors, including an expanding population, and the subsequent increase in the number of households requiring power and heating, have also contributed to this increase. While energy use affects household and business related costs, it also impacts the environment, accounting for more than three quarters (77%) of Australia’s total greenhouse emissions in 2009.

Legislation setting the foundation for a carbon price was passed through the Senate in 2011. This was aimed at reducing greenhouse gas emissions (carbon pollution) and moving Australia to a clean energy future. This legislation, coupled with widespread media coverage on the potential financial impact on households, has fuelled public interest in energy consumption and related costs.

This article looks at current household energy use and costs, as well as how Australians are implementing household energy saving practices.

WHAT TYPES OF ENERGY AND HOW MUCH DID WE USE?

In 2009-10, Australia’s net energy consumption, including both industry and household energy use, was 3,962PJ. This was an increase of 39PJ (1%) from 2008-09. The main fuels consumed were natural gas (24%), electricity (22%), diesel (18%) and petrol (16%), while solar energy accounted for less than 1% of Australia’s net energy consumption.

The majority of energy consumption in Australia is by industry, accounting for nearly three quarters (74% or 2,947PJ) of total net energy consumption in 2009-10. Natural gas (27%), electricity and diesel (both 22%) were the main energy sources used by industry.

The remaining one quarter (26%) of Australia’s total net energy use in 2009-10 was by households (1,014PJ). Despite this being an increase of 2% since 2008-09, household energy use per capita remained unchanged over this time (46GJ). The types of energy most commonly used by households, including fuels used for transport purposes, were petrol (45%), electricity (21%) and natural gas (14%).

Australia’s household energy consumption has increased slightly over the last decade. According to data from the Bureau of Resources and Energy Economics (BREE), Australian households’ energy consumption, excluding fuels used for transport purposes, grew by 54PJ (14%) between 2000-01 and 2010-11 (from 398PJ to 452PJ). The fuels with the greatest increase in household
consumption over this period were electricity (25%, from 179PJ up to 223PJ) and natural gas (22%, from 122PJ up to 148PJ).

State and territory variations

Although household energy consumption across the states and territories remained relatively stable over the last decade, there are variations in the types and amounts of fuels most commonly consumed across the states and territories. This is partly influenced by the size of their populations.

BREE data showed that, in 2011, households in New South Wales (NSW), combined with those in the Australian Capital Territory (ACT), consumed the most electricity in 2010-11, with 86PJ, while the Northern Territory (NT) had the lowest electricity consumption across the states and territories with 2.1PJ.4

Natural gas consumption was highest in Victoria, home to Australia’s most extensive reticulated gas network,5 with 100PJ in 2010-11. The NT and Tasmania used virtually no natural gas (with 0PJ and 0.1PJ respectively).

HOW HAS THE COST OF ENERGY CHANGED OVER TIME?

The cost of electricity, gas and other household

HOUSEHOLD ENERGY CONSUMPTION, BY FUEL TYPE, BY STATE AND TERRITORY – 2010-11

In 2010-11

The different energy sources used overall by Australian households were:

<table>
<thead>
<tr>
<th>Fuel Type</th>
<th>NSW</th>
<th>Vic</th>
<th>QLD</th>
<th>SA</th>
<th>WA</th>
<th>NT</th>
<th>Tas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>223.0</td>
<td>85.9</td>
<td>42.0</td>
<td>46.2</td>
<td>18.2</td>
<td>20.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>148.2</td>
<td>24.3</td>
<td>100.2</td>
<td>2.9</td>
<td>10.7</td>
<td>10.0</td>
<td>0.0</td>
</tr>
<tr>
<td>LPG</td>
<td>11.5</td>
<td>3.2</td>
<td>3.5</td>
<td>2.4</td>
<td>0.9</td>
<td>1.1</td>
<td>0.1</td>
</tr>
<tr>
<td>Solar</td>
<td>10.6</td>
<td>3.2</td>
<td>1.6</td>
<td>1.9</td>
<td>0.7</td>
<td>2.8</td>
<td>0.3</td>
</tr>
</tbody>
</table>

Legend

* Data for NSW includes household energy consumption in ACT.
All data relates to non-transport energy use.

fuels has risen in recent years. In the five years to the June quarter in 2012, the ABS Consumer Price Index (CPI) rose by 15% (from 157.5 to 180.4). During the same period, Australia’s retail electricity prices rose by 72%, while the price of gas and other household fuels rose by 45%.

Increases in retail electricity prices varied across the capital cities. Between June 2007 and June 2012, the largest increase in the retail price of electricity was in Melbourne (84%), followed by Sydney (79%). Darwin and Canberra had the smallest increases in retail electricity prices, with 42% and 45% respectively.

Between June 2007 and June 2012, the retail price of gas and other household fuels also rose across the capital cities. The largest increase was in Perth, where prices rose by 88%, followed by Canberra (48%). The smallest increases were in Darwin and Hobart, with 21% and 20% respectively.

HOW MUCH ARE WE SPENDING ON ENERGY?

According to results from the ABS Household Expenditure Survey (HES), in 2009-10 electricity, gas, heating oil and wood accounted for $32 per week of household expenditure. Although this was a real increase of nearly $5 per week (at 2009-10 prices) since 2003-04, the amount as a proportion of real total household expenditure remained the same, at 2.6%.

Some Australian households reported being under financial stress in 2009-10, with more than one in ten households (13%) reporting being unable to pay electricity, gas or telephone bills on time.

In the states and territories

Despite the varying tariff schemes in place across the country, and variations in households’ heating and cooling requirements across climate zones, there was little difference between state and territory households’ expenditure on electricity, gas, heating oil and wood.

In 2009-10, Tasmanian households had the highest expenditure on electricity, gas, heating oil and wood as a proportion of their total expenditure on goods and services, with 3.6%.

HOW ARE WE REDUCING OUR ENERGY USE?

Climate change has been identified as one of the biggest issues facing the nation and the world. Results from the 2007-08 Environmental Views and Behaviours component of the ABS Multipurpose Household Survey

(303x256)

(303x256)
showed that nearly three quarters (74%) of Australian adults were concerned about climate change. This, in addition to concerns about rising energy costs, has led to greater attention being focused on ways in which households and individuals can reduce their carbon footprints.

**Installing solar energy units**

Greater environmental awareness, and a desire for cheaper alternatives for powering homes, may be responsible for the considerable increase in the number of renewable energy generation units installed in households over the last decade.

Between 2001 and 2011, Renewable Energy Certificate data shows that the number of households installing solar energy units greatly increased, rising from 118 in 2001 to 85,550 in 2009, before sharply increasing to 639,803 in 2011.

Across the states and territories in 2011, NSW and Queensland had the highest number of households with solar units, with 168,167 and 166,395 households respectively. The NT had the fewest number of households with these units installed, with 1,462 households.

While household renewable energy units have low operating costs, initial installation can be expensive. A range of different government grants and rebates have been available to households to help reduce installation costs and encourage the use of renewable energy in the home. Differences between these policies and rebate schemes can impact household consumption of energy sources, and should be taken into account when comparing trends across the states and territories.

**Selecting household appliances**

Many households are conscious of the amount of energy consumed by their household appliances and are adjusting their purchases accordingly.

The ABS 2011 Energy Use and Conservation Survey showed that many households considered cost price and energy star rating to be the most important considerations when purchasing household appliances in the last 12 months, with nearly half of households citing these factors as having influenced their purchases (with 47% and 45% respectively). Other factors such as the features of the appliances (19%) also influenced households’ purchasing choices.

**Insulating our homes**

Insulation helps to ensure dwellings are warm in winter and cool in summer, and can assist in reducing household power bills and greenhouse gas emissions.

In 2011, more than two-thirds (69%) of Australian households had insulation, a 9% increase since 2005. Insulation was most common in separate houses, with more than three-quarters (77%) of these dwellings being insulated, compared with less than one-third (29%) of

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**REASONS WHY PERSONAL ELECTRICITY USE DECREASED – 2007-08**

<table>
<thead>
<tr>
<th>Reason</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tried to conserve energy</td>
<td>80</td>
</tr>
<tr>
<td>Lifestyle changes</td>
<td>60</td>
</tr>
<tr>
<td>Purchased/used energy efficient electrical appliances</td>
<td>40</td>
</tr>
<tr>
<td>Rebate offered</td>
<td>20</td>
</tr>
<tr>
<td>More use of other sources of energy instead</td>
<td>20</td>
</tr>
<tr>
<td>Got rid of old electrical appliances</td>
<td>10</td>
</tr>
<tr>
<td>Cost saving</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: ABS Environmental Views and Behaviour, 2007-08 (cat. no. 4626.0.55.001).

**UNDER THE PUMP**

With motor vehicles being a part of daily life, the cost of fuelling our vehicles is a matter of concern for many people. In 2009-10, average weekly household expenditure on motor vehicle fuels, lubricants and additives was $51 per week. This was a real increase of $12 (at 2009-10 prices) since 2003-04. As a proportion of real total average weekly household expenditure on goods and services, expenditure on these items rose from 3.7% to 4.1% during this time. However, this increase could partly be due to the inclusion of salary-sacrificed expenditure on motor vehicles and associated running costs in the ABS 2009-10 HES.

There was little difference between state and territory households’ expenditure on these items as a proportion of their total expenditure on goods and services.
flats, units and apartments.

The ACT (81%), Tasmania (79%), SA (78%) and Victoria (77%) had the highest proportions of households with insulation across the states and territories, while less than half of NT households were insulated (44%). Across the states and territories, comfort was the most commonly reported main reason for households having installed insulation (70%), with 3.6% of households citing reducing energy use as their main reason.

**Limiting our electricity use**

Findings from the *Environmental Views and Behaviour Survey* showed that, of people who reported that they were concerned about climate change in 2007-08, most (92%) said that they had taken steps to limit their personal electricity use. However, a large proportion (78%) of those not concerned with climate change had also taken steps to limit their electricity use, reflecting many Australians’ concerns about the rising cost of energy.

Older Australians were more likely than younger Australian adults to take steps to limit their electricity use. Nearly nine in ten (88%) people aged 65 years and over took steps, compared with more than seven in ten (74%) people aged 18-24 years. People aged 18-24 years were more likely than older people to report that they did not care how much electricity they used, with 5% of people in this age group, compared with 1% of other adults.

The most commonly reported reason for people aged 25 years and over not having taken steps to limit their electricity use was that they felt their electricity consumption was already low enough (38%), with nearly half (48%) of people aged 65 years and over giving this reason. Conversely, the most commonly reported reason among people aged 18-24 years was that they had not thought about saving electricity (37%). Young people’s tendency to be less mindful of electricity saving practices could partly be due to a greater likelihood of them still living in the family home and not bearing the responsibility of paying electricity or gas bills. In 2006-07, around half of young men (49%) and young women (45%) aged 18-24 years had never left the parental home, with more than two fifths (41%) staying for financial reasons.

For people whose electricity use decreased, four in five (80%) reported that this was due to efforts to conserve energy. While this was the most common reason given across all age groups, other reasons such as the purchase or use of energy efficient electrical appliances (24%), lifestyle changes (22%) and cost saving (21%) were also commonly reported.

**LOOKING FORWARD**

The Australian Government has committed to achieving a Renewable Energy Target of 20% of Australia’s electricity coming from renewable sources by 2020. Although the Australian Government’s carbon price policy is targeted at Australia’s largest polluters, policies such as this, coupled with the rising cost of energy, are seeing Australians become more aware of their own energy use in the home.

This increased awareness of energy consumption, and the financial costs involved, is likely to see households continue to engage in energy saving practices into the future.

**ENDNOTES**


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energy consumption in australia

fast facts from the ‘energy white paper – at a glance’, republished here courtesy of the department of industry, innovation and science

energy consumption 2012-13

- oil: 38%
- coal: 33%
- natural gas: 24%
- renewables: 6%

oil accounted for 38% of energy consumption

over the past 10 years, the retail price of gas for households increased by 8% a year

petrol, diesel and aviation fuel accounted for over 90% of transport energy use in 2012-13

- petrol, diesel and aviation fuel: >90%
- alternatives (e.g. lpg): 5%

australian petrol prices are amongst the lowest of the countries in the organisation for economic co-operation and development.

consumption trends of 2012-13

- oil: +1%
- gas: +2%
- renewables: +12%
- coal: -6%

oil, gas, renewables up … coal down

household electricity prices increased by around 50 per cent nationally between 2010 and 2013 but prices have moderated and future price increases are expected to be lower than recent rises

most gas in 2012-13 used for industrial and electricity purposes with a smaller amount used by households …

- petrol, diesel and aviation fuel: 1,232pj
- natural gas: 155pj

energy productivity improving

australia’s energy productivity, as measured by the ratio of real gdp to primary energy consumption, has improved at an average rate of 1.6 per cent a year from 2000-01 to 2012-13.
AUSTRALIAN ENERGY UPDATE

BELOW IS THE SUMMARY FROM THE LATEST ANNUAL ENERGY UPDATE, PRODUCED BY THE DEPARTMENT OF INDUSTRY, INNOVATION AND SCIENCE

Energy consumption

- Australian energy consumption fell by 1 per cent in 2013-14 to around 5,831 petajoules, despite continued growth in the Australian economy. Energy productivity (gross domestic product/energy consumption) rose by 4 per cent.
- Growth in energy consumption in the mining, transport and services sectors was offset by a continued fall in energy use for electricity generation and manufacturing, as well as by households. Transport overtook the electricity supply sector as the largest energy user in 2013-14.
- Final energy consumption (excludes energy used in energy conversion activities) rose by 1 per cent in 2013-14.
- Oil remained the largest primary energy source in Australia, at 38 per cent in 2013-14, followed by coal (32 per cent) and natural gas (24 per cent). Renewables accounted for 6 per cent of Australia’s energy mix.
- Use of gas and renewables grew by 2 per cent and 4 per cent respectively in 2013-14. In contrast, oil consumption fell by 1 per cent and coal by 5 per cent.
- Energy consumption fell in most states and territories in 2013-14.

Energy production

- Energy production fell by 4 per cent in 2013-14 to 18,715 petajoules, as lower uranium and oil production outweighed growth in black coal.
- Uranium production fell by 38 per cent, with disruptions at the Ranger mine and the closure of the Honeymoon mine. Oil production fell by 5 per cent as declining production at aging fields outweighed new supply.
- Black coal production rose by 8 per cent in 2013-14 to 11,807 petajoules, supported by new capacity for export markets. Natural gas production increased by 2 per cent.

Electricity generation

- Electricity generation in Australia continued to decline in 2013-14, by 1 per cent to 248 terawatt hours (894 petajoules). The continued fall in industrial and residential electricity demand in the National Electricity Market has been largely responsible for this decline. It has been partially offset by continued growth in off-grid generation.
- Coal-fired generation declined by 5 per cent in 2013-14. Despite this, coal remained the largest source of electricity generation in Australia at 61 per cent. Natural gas constituted 22 per cent of total electricity generation in 2013-14.
- Renewable generation rose by 12 per cent in 2013-14, comprising 15 per cent of total generation in Australia. Most growth continued to occur in wind and solar energy, with the share of hydro in total renewable generation falling below 50 per cent for the first time.

Energy trade

- Energy exports grew by 2 per cent in 2013-14 to 15,658 petajoules. The modest growth was due to a fall in uranium and crude oil exports, which weighed against higher coal exports. LNG exports also fell marginally.
- Energy imports were relatively flat, falling by less than 1 per cent to 2,275 petajoules. A decline in crude oil imports was largely offset by a rise in imports of refined products, reflecting reduced domestic refining capacity.

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C limate change is arguably the greatest challenge faced by humanity. Global greenhouse gas emissions from fossil fuel use continue to grow each year, despite attempts to limit them through mitigation and energy efficiency measures. The effectiveness of these measures has been largely offset by population growth and increasing uptake of more affordable electrical appliances.

To deal with this challenge, important goals for housing include:

- Achieving the significant reductions in greenhouse gas emissions required to limit global warming and sea level rise
- Using renewable energy while managing demand and maintaining security of supply
- Reducing travel demand and finding viable (post-peak oil) sources of energy for transport.

More background on these challenges can be found in the section ‘Housing of the future’, at www.yourhome.gov.au/housing

**Energy use in the Australian residential sector 1986-2020. Data are projected energy use for 2012**

<table>
<thead>
<tr>
<th>HOUSEHOLD ENERGY USE</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heating and cooling</td>
<td>40</td>
</tr>
<tr>
<td>Water heating</td>
<td>21</td>
</tr>
<tr>
<td>Appliances and equipment including refrigeration and cooking</td>
<td>33</td>
</tr>
<tr>
<td>Lighting</td>
<td>6</td>
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</tbody>
</table>


According to the Department of the Environment website, Australian households are directly responsible for about one-fifth of Australia’s greenhouse gas emissions. The average household’s energy use generates over 7 tonnes of greenhouse gas emissions from its premises, which could be significantly reduced by:

- Reducing energy use through good design, the use of energy efficient technologies, and behaviour that focuses on energy conservation
- Using renewable energy sources such as solar and wind, which produce very few greenhouse gas emissions. Non-renewable energy comes from diminishing fossil fuel reserves and can produce significant greenhouse gas emissions. Most electricity comes from coal-fired power stations that release high levels of carbon dioxide and other pollutants into the atmosphere. 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 of grid electricity.

The articles in this section focusing on energy use in the home are complemented by information on reducing car dependency and choosing fuel efficient and low emission vehicles in the Transport article on the website.

The average Australian home is responsible for around 7 tonnes of greenhouse gas emissions each year. These emissions can be greatly reduced by following the advice in this section.

**Heating and cooling**

Heating and cooling accounts for 40% of household energy use, making it the largest energy user in the average Australian home. However, very little energy is required to make a well-designed house comfortable, and mechanical heating and cooling should never be used as a substitute for good design. Install space heating and/or cooling only in the rooms that require it, or if you use a centralised system ensure it is zoned. Centralised options include ducted air and hydronic systems. The latter are usually gas fired but can be heated by a solar system or heat pump.

For heating, gas heaters and efficient reverse cycle air conditioners produce a third (or less) of the greenhouse gas emissions of standard electric heaters. Heat shifters and solar air heaters can assist by reducing the amount of heating required. Fans are the lowest energy cooling option, followed by evaporative coolers, which work best in climates with low humidity. Each of the different heating and cooling options has pros and cons, and choices on type and size should be informed by energy labels.
**Hot water service**

Heating water accounts for 21% of the energy used in the average Australian home, and is the largest single source of greenhouse gas emissions (approximately 22%) from home energy use. Electric water heaters in particular contribute to these high emissions. Reducing hot water use and using renewable energy sources to heat water are effective ways to reduce your environmental impact. The most appropriate and efficient hot water service can be found for your household size, water use patterns and climate. The two basic types of water heater – storage systems and continuous flow (instantaneous) systems – each use a variety of energy sources including solar energy, gas and electricity.

**Lighting**

Lighting in homes consumes 8-15% of the average household electricity budget, although this can differ depending on the lighting technologies used, lighting design and user behaviour. Efficient and well-designed lighting can make for significant energy savings. The first step is to design your home to maximise the use of daylight so that electric lighting is not required during daylight hours. Then, create a lighting design strategy that meets your needs in the most efficient way, including daylight design. Lighting decisions need to take into account the characteristics of lamp technologies such as compact fluorescent and LED, lighting switches and controls, safety requirements, and the life cycle costs of different lighting options.

**Appliances**

On average, household appliances and equipment account for about one-third of household energy use and almost half of household greenhouse gas emissions. Of all appliances, the fridge/freezer and television are typically the highest individual electricity users.

Choices about purchases of whiteware (refrigerators, freezers, washing machines, clothes dryers and dishwashers) and equipment for pools and spas (pumps and filters) should include operation and maintenance, not just the original price. Appliance choices can be informed by the Energy Rating Labelling Scheme and Water Efficiency Labelling Scheme, which allow comparison of different appliances by a star rating. The more stars, the more water or energy efficient the appliance. However, size is also a factor: a large 5 star model may use more energy or water than a small 4 star model. The label includes total energy or water consumption figures, alongside the star rating.

**Home automation**

Appliances and equipment in the home can now be automated or remotely controlled to turn on or off or adjust operating settings. Homes using automation, often with integration of broadband communications, are called ‘smart homes’. Home automation systems can improve the energy efficiency of your home if they are designed for this purpose and save more energy than they use. However, energy efficient house design, appliances and lighting must still be the priority. The various home automation systems available can contribute to management of different energy uses around the home, and provide important feedback to householders by displaying real-time electricity use.

**Renewable energy**

Electricity generation systems based on the conversion of solar and wind resources are becoming increasingly accessible to the average homeowner. Renewable energy can also be used for home heating and

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cooling, hot water and even cooking. On-site production of renewable electricity by photovoltaic systems and wind generators requires design and installation by specialists with the knowledge and accreditation. Renewable energy systems, both grid connected and stand alone, usually operate with low running costs. They can be expensive to install but rebates and other financial incentives may be available to offset the initial cost. Maintenance can also be a cost issue for systems reliant on batteries. To get the most out of your renewable energy system, minimising energy demand in the home first is crucial.

Photovoltaic systems
Photovoltaic systems are increasingly used to supply price-competitive, zero greenhouse gas emission energy to homes and businesses across the country. The average cost of producing electricity from solar modules over their lifetime is now broadly equivalent to the average cost of purchasing electricity from the grid. Module types fall into two categories, crystalline silicon and thin film, and can be mounted on frames or building integrated. Siting, orientation and tilt of modules are all critical to gain maximum efficiency at the home location, or to match energy production to peak loads. The size of a system is also governed by the household. Design and installation of photovoltaic systems must be undertaken by an accredited specialist.

Wind systems
The amount of renewable electricity harnessed from the wind is growing rapidly. Australia has an abundant wind resource, which, if used to generate electricity, can save significant greenhouse gas emissions. Only turbines in open sites and on sufficiently tall towers produce energy efficiently. Wind systems installed on roofs typically do not produce much electricity, have short life spans, and are thus never economically sound. Be wary of turbine installers or manufacturers claiming products are suitable for urban or turbulent locations, and always prioritise solar photovoltaics if investigating residential renewable electricity options in urban areas.

Site assessment, determining appropriate tower heights, and choosing a system size, design and manufacturer are best done by an experienced contractor.

Batteries and inverters
Batteries store energy for use when demand exceeds output, for example at night when a photovoltaic system is no longer generating electricity. Inverters turn energy from DC to AC mains power. Any renewable system also includes switches, circuit breakers and fuses to ensure safety and allow equipment to be isolated for maintenance. Grid connected systems usually consist of the energy source, inverter and meter. Stand-alone systems usually comprise the energy source, a battery bank, inverter, battery charger and often a fuel generator for back-up power. Each system also includes a charge controller that can be part of the inverter or other equipment.

Smart meters, in-home displays and smart appliances
'Smart' meters offer a range of capabilities that traditional meters do not, including the transmission of energy use data to your utility, fault monitoring, and communication between the utility and home appliances. In-home displays provide information on real-time energy use and costs, which is useful in guiding energy-saving behaviour and avoiding energy peaks. Data can be transmitted to computers and mobile devices. Smart appliances can take advantage of lower electricity price periods via signals from the utility and automation. This convergence of technological capabilities is part of the 'smartening' of the grid, with closer integration of the supply and demand sides of the electricity system through better communications and controls. This emerging technology is changing energy use patterns.

Transport
Some of your most important energy decisions relate to transport. Where will you live? Is there good public transport? Will you have to buy a second car? An energy efficient home can still be a high energy household if you rely heavily on your car. Car dependency can be reduced by public transport use, walking and cycling, or using car share schemes. Fuel efficient and low emission cars, driven efficiently and well maintained, also reduce energy use. As the range and availability of electric cars are increasing, new homes could provide charging points in garages or carports.

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Energy conservation fact sheet

Climate change threatens to destroy the natural resources upon which humans depend, impacting human health, the economy and biodiversity. With coal the major source of energy in Australia, Australia’s contribution to global warming is disproportionate to our population size. Clean Up Australia explains the problem and offers the solution: energy conservation and renewables.

**THE PROBLEM**

**Energy and climate change**

Seventy five per cent of energy in Australia is produced by the burning of coal, which releases carbon dioxide: a greenhouse gas. Excessive accumulation of greenhouse gases enhances the natural warming effect whereby gases trap energy from the sun. Global warming disrupts natural processes on Earth. Some examples include: rises in sea levels caused by the melting of ice caps; coral bleaching from increased water temperature; increases in catastrophic weather events; and prolonged droughts jeopardising water security, agriculture and biodiversity.

**The coal economy**

Australia is the major exporter of coal contributing about 54% (metallurgical coal) and 24% (thermal coal) of global trade. Whilst Australia’s domestic consumption of coal contributes less than 0.5% of global emissions, this is significant given our small population. Our role as the world’s leading coal exporter implicates us in global emissions.

Australian mineral industries including aluminium production are economically powerful and energy intensive. About 10% of Australia’s electricity capacity is used for aluminium production. Bauxite must also be extracted, with mining requiring the burning of large amounts of coal and other fossil fuels.

The recent trend towards providing water security for Australian cities from energy-intensive desalination plants also has a significant global warming impact.

**Household energy consumption**

Energy consumption in Australia has increased per person in recent years. Energy consumption is expected to rise further as more Australians live alone and householders are increasingly installing air conditioners to cool larger homes.

**Energy policy**

Scientists have known about climate change for decades but in recent years, energy security and climate change have become global priorities.

After the Copenhagen Accord (2009) for countries to express their ‘non-binding’ commitments to reduce climate change, in ‘Paris 2015’ climate conference the aim will be to get all countries to commit to keeping global temperature rise below 2°C (above

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**DID YOU KNOW?**

- The coal export industry in Australia was worth 40 billion in 2013/2014.
- Japan remains the primary destination for Australia’s thermal coal exports (82 Mt in 2013).
- Australia is the world’s sixth largest producer of aluminium, about 4% of world’s production in 2014.
- The Australian residential energy consumption is expected to rise by 56% of 1990 levels by 2020: an increase of almost 4 million households.
- Under the Renewable Energy Target, there will be as much energy produced from renewable sources by 2020 as electricity currently generated to power Australian households.
- % of households using solar energy: 24% in SA, 20% in QLD, 16% in WA, 10% in NSW, Vic, Summary: 14% in Australia.
- Only half the households consider the ‘energy star rating’ when choosing major household appliances. Only 40% consider ‘water efficiency’.

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pre-industrial levels or 1.4°C above present levels) after year 2020.

The Australian Government commit is “Australia will reduce its greenhouse gas (GHG) emissions by 25 per cent compared with 2000 levels by 2020 if the world agrees to an ambitious global deal capable of stabilising levels of GHGs” For a full commitment text see reference.7

Whilst they have deferred the emissions trading option, the Australian Government has committed to a Renewable Energy Target to increase the proportion of renewable energy to 20% of the energy market by 2020.8

Householders may be able to receive a benefit under the Small-scale Renewable Energy Scheme (SCRES) to help with the purchase cost.9

THE SOLUTION

Renewable energy sources

Renewable energy sources can be harnessed indefinitely whereas coal and other fossil fuels are finite resources.

Australia’s main renewable energy sources are:11

Hydro 45.9% Electricity from dams
Wind 30.9% Electricity from wind
Solar 15.3% Electricity from sunlight (photovoltaic cells)
Bioenergy 7.6% Energy from biological sources

How to conserve energy

If you own your own home, consider installing insulation or investing in a solar hot water heater.

If you need to use air conditioning, avoid turning the thermostat on to very cold settings. When the system works harder, it uses significantly more energy.

Buy green power. Most energy suppliers give you the option of sourcing a proportion of your energy from renewable sources.

Check the star ratings on appliances. You will save money as well as energy.

Simple tips to conserve energy

• Switch off fridges that are not in use
• Turn off power points at the source
• Use cold water in the washing machine
• Turn off lights when not in use.

ENERGY SOURCES

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<th>Type</th>
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<th>Disadvantages</th>
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<tbody>
<tr>
<td>Coal</td>
<td>Currently cheap because environmental costs are not reflected in prices</td>
<td>Contributes to global warming and air pollution</td>
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<td></td>
<td>Requires mining of finite resources</td>
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<td>Solar</td>
<td>No air pollution or contribution to global warming</td>
<td>High initial investment cost</td>
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<td></td>
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<td></td>
<td>Energy source independent from markets</td>
<td>Energy available when sun shining only</td>
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<td></td>
<td>Ability to sell excess power back to grid</td>
<td></td>
</tr>
<tr>
<td>Wind</td>
<td>No air pollution or contribution to global warming</td>
<td>Wind turbines can be unattractive</td>
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<tr>
<td></td>
<td>Energy source independent from markets</td>
<td>Large tracts of land required for wind farms</td>
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<tr>
<td></td>
<td>Ability to sell excess power back to grid</td>
<td>Noise</td>
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<tr>
<td></td>
<td></td>
<td>Wind turbines represent a threat to birds</td>
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</tbody>
</table>

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ENERGY SAVING TIPS FOR HOME

The following practical tips from ActewAGL can help you save on your energy bill

**Laundry**
Buy a washing machine that suits your needs and use it wisely.
- Adjust the water level to match the load
- Use the soak cycle to remove stains
- Use the sud-saving option to reuse water from previous loads
- Consider using warm or cold water settings rather than hot.

Drying clothes costs nothing if you use the sun, but this isn’t always an option. A clotheshorse can be used in a spare room or near a heater. Avoid using a heater just for drying clothes.

When you do use a clothes dryer:
- Consider using the fan only
- Set the temperature no hotter than warm
- Keep the vent free of lint and clean the filter after each load
- Switch the dryer off as soon as the clothes feel dry – never overload or underload the dryer.

**Fridges and freezers**
- Lower temperatures increase energy usage
- Defrost ice build up
- Make sure doors seal properly
- Keep the condenser coils and seals dust free
- Keep the fridge out of direct sunlight and away from heat sources
- Don’t put hot food in the fridge
- Turn off a second fridge that’s not being used. An extra fridge can cost over $100 a year to run.

**Cooling**
Minimise energy used for cooling the home.
- Close off rooms and sections of the house that are not being cooled
- To enable air conditioners to run more efficiently, keep air filters clean and outside units clear of obstructions
- Every degree can reduce your costs by 10%. If you need to cool your home set your thermostat to between 24°C and 25°C
- Leave fresh air and exhaust controls, where available, on cooling units in the closed position
- Shade windows with awnings or curtains. Blocking the sun before it strikes your glass could save you up to $100 per year in cooling costs
- If using air conditioning, set fans to high speeds for greatest efficiency
- Insulated homes retain cool air and minimise heat transference from the outside air
- Try opening your house up in the evening to let in the cool night air and shut all windows and doors during the day to keep out the afternoon heat
- Fans can be a cheap, low-energy way of moving cool or warm air around the home. The stream of air blowing over someone in a room can reduce the temperature of the air around them by 2°C to 3°C.

**Lighting**
By replacing incandescent lights with standard compact fluorescent tubes, you can save up to 75% of your lighting energy dollars (lighting makes up about four per cent of your electricity account). This is especially true for high-use areas such as kitchen, lounge and living areas.

Incandescent globes are the most common form of household lighting. They are cheap to replace and come in a wide variety of shapes and forms. They can be dimmed only and have an average life span of 1,000 hours. They are the least efficient as 95% of energy consumed is given off as heat.

Quartz halogen lights are twice as efficient as incandescent globes. They have a life span of around 2,000 to 4,000 hours and come in a wide selection of wattages. They cost more to replace than incandescent globes.

Fluorescent lights are the most energy efficient of all light sources and are ideal for areas where lighting is required for long periods. Fluorescent lights fall into two categories tubular and compact fluorescent (CFLs). CFLs use only 25% of energy to produce the same amount of light as incandescent lights and last up to eight times longer than other conventional heating. Switching on and off reduces the expected life of the tube.

**Hot water**
Hot water uses about 30% of the energy consumed yearly in the average home, so be sure to:
- Check regularly for leaks – a leaking hot water
system wastes water and uses energy continually
• Install a water restrictor or low-flow showerhead
• Check hot water taps for leaks
• Insulate hot water pipes for at least one metre from the storage heater to retain heat
• Have a short shower instead of a bath
• Switch off the hot water system when going away for more than two weeks
• Fill the kettle or jug from the cold tap and only fill with the amount of water needed.

Heating
Heating is a large part of your energy account, yet there are many simple ways of reducing the cost.
• Every degree can reduce your costs by 10%. If you need to heat your home set your thermostat to between 18°C and 20°C
• With the use of good insulation in your roof, walls and floors you can save up to $100 every year
• Changing to a more efficient appliance such as a 6 star rated gas heater can save you up to 30% on your heating bills (depending on the rating of the current appliance)
• Install double glazed windows
• Close off areas being heated
• Block off chimneys when not in use
• Use time switches to provide heating when required
• Installing good-quality and well-fitted curtains with pelmets and blinds can save you up to 10% on your heating bills
• Instead of heating the entire bedroom, use an electric blanket just to warm up the bed
• Cracks and gaps in houses can account for 10-15% of heat loss. Save energy by sealing up gaps and install draught excluders under doors, soft rubber weather strips around windows, and seal around skirting and architraves
• On sunny winter days, take advantage of free warmth by pulling back the curtains and letting the sun through the windows.

Cooking
• Microwaves cook food 3 times faster than standard full-size ovens, saving up to 70% of electricity used for cooking
• Fan-forced ovens cost 35% less to run than conventional ovens. They force the heat evenly throughout the oven, reducing your cooking time by one-third
• Save electricity by using efficient appliances like pressure cookers and electric frypans. They use about half the energy of a full-size oven
• Use the smallest pots and pans possible – it takes less energy to heat them
• Cooked food must be kept at 60°C and above to stop growth of dangerous bacteria. At 80°C you’ll be wasting energy
• It takes a lot of energy to bring food to the boil, but once boiling the energy setting can be cut by two-thirds. Some vegetables cook quicker in the microwave in less water, with higher retention of water-soluble vitamins
• Place food in the oven immediately after the oven is turned on and you’ll save energy
• Use the oven light to check on food in the oven rather than opening the door
• Use dividers and steamers to cook vegetables in the same pot
• It’s best to thaw frozen food in the refrigerator, later assisted by microwave if necessary.

Home office
• Implement paper-reducing strategies such as double-sided printing and reusing paper
• Use email instead of sending memos and faxing documents
• Purchase appropriately-sized copiers for your needs.
• If appropriate, use laptop computers – they consume 90% less energy than standard desktop computers
• When purchasing PCs, monitors, printers, fax machines and copiers, specify models that ‘power down’ after a user-specified period of inactivity – and make sure the power-down features are enabled
• Stand-by power can cost a typical Australian household $50 to $100 per year, reduce costs by turning appliances off at the power point.

Reasons for a high bill
If you’ve noticed changes in your energy bills, ask yourself these questions to pin-point the reason for the change in your usage and provide you with real solutions to reduce consumption.
• Have you recently had guests to stay? Even just a couch-surf can have an impact on your bill.
• Have you bought new appliances? We can assist you to make sure you’re using your appliances in the most cost-effective manner.
• Check to see if your hot water system is leaking. Contact Home Services for installation, repair and service of your appliances.
• Check to see if your fridge seals are tight. Contact Home Services for installation, repair and service of your appliances.
• Have you recently had a baby? Loads more washing plus keeping your new addition’s room warm will see your bills increase. See our energy saving ideas for other ways you can save.
• Read your meter daily and make a record of the results. It’ll give you a clear picture of when your consumption increases and force you to think about why.
• Complete our winter checklist. It’ll help you prepare your home as the temperatures drop and help you manage your winter energy costs.

Understand your electricity bill and manage your usage

Understanding your electricity bill will help you to manage your usage and how much you pay. You can reduce some of your costs by changing how you buy or how you use energy at home, according to this fact sheet advice from the Department of Industry, Innovation and Science.

1. How does my electricity retailer calculate my bill?

Your electricity bill is usually made up of two key charges: a ‘supply charge’ which is a fixed cost per day and a ‘usage charge’ which is calculated based on the amount of electricity that you use and, sometimes, what time of day you use electricity. Your usage is measured by your meter over time and expressed as power units per hour on your bill.

2. What steps can I take to reduce my electricity bill?

You can reduce your bill by reducing the amount of electricity you use (your usage charge) or by changing your electricity contract to pick one more suited to how and when you use electricity at home. However, reducing your usage will not change your supply charge.

www.yourenergysavings.gov.au has a range of easy-to-read, practical information pages on how to cut power bills, it shows you how to get the new Energy Rating App to compare the running costs of your appliances, and has up-to-date summaries of all government energy efficiency and sustainability rebates and assistance.

For customers with smart or interval meters, you can also reduce the amount you pay by watching how much electricity you use during peak times. See Question 7 of this fact sheet for more details on time of use tariffs.

3. How do I know what my usage is compared to other households?

You can compare your usage with a similar household at this website, www.energymadeeasy.gov.au/bill-benchmark. A comparison of the usage of similar households should also be on your bill.

You might also consider comparing your usage with the same period from a previous year.

A useful tip when looking at your bill is to compare it with the same bill from a previous year.

When comparing your current bill with a previous bill, consider what has changed during this time:

- The weather may have been different
- The number of people living in your house may have changed
- Your habits may have changed or you may have bigger or more appliances.

All of these impact on your electricity use and bill.

Things that can affect your bill: changes in weather, number of people, habits and appliances.

4. What are the basic features of an electricity bill?

Your electricity retailer prepares your bill in line with your contract, which by law must be at least once every 3 months. Your retailer can put a range of information in your bill, such as offers they have available, but there is some important information that all electricity bills must show, including:

- Your name, account number and address
- The total amount payable or in credit by you
- Your billing period and the pay-by date for the bill
- The amount of electricity you used over the period of the bill.

If you are unsure about your electricity charges or your bill you should check your electricity retailer’s website or call them. Further information on complaints or switching electricity companies can be found in Factsheet 3, at www.aer.gov.au/Consumers or by calling 1300 585 165.

Did you know?

- As an energy customer, you can ask your electricity retailer to set up regular payments towards your bill so it is easier to budget, especially if you are on a fixed income. Or, you can ask for a more frequent billing cycle.
- If you are a Centrelink customer, you can use Centrepay. This is a free service for customers to pay bills as regular deductions from their payments.
5. Are there different types of contracts?

There are usually two types of electricity contracts available to you. It is important that you know the difference. If you haven’t chosen your electricity retailer, you’re likely to be on a standard retail contract.

**Standard retail contracts** are basic, no frills electricity contracts with terms and conditions that are set by law. The price for these contracts can only change once every six months and there are no early termination charges if you choose to exit this contract.

These contracts are often more expensive than market retail contracts, as they do not include features like discounts or other incentives. It is in your interest to make sure you are on a contract that is best suited to your needs.

**Market retail contracts** are electricity contracts that can have different terms and conditions to a standard retail contract. Retailers can tailor these contracts to have features such as discounts, fixed terms, and different costs of electricity at different times of the day and other incentives. They can also alter the fees and charges including introducing exit fees. However, these contracts still contain basic terms and conditions to protect you.

It is important that you know what fees and charges apply to a contract before you agree to it. Like many other contracts (such as mobile phones) if you choose to end a market contract before the agreed period, your electricity retailer has the right to charge you an early termination fee.

### Choosing your contract

There is a website that can help you to compare electricity and gas contracts in your area. It is gradually being rolled out across states and territories (currently available in NSW, ACT, SA, TAS and South-East QLD) to help you make informed choices on your energy supply. This service is available at: [www.energymadeeasy.gov.au](http://www.energymadeeasy.gov.au) or by calling 1300 585 165.

6. Why shop around?

You can shop around for a contract that has prices and conditions that suit your needs. Some people have saved by changing from a ‘standing offer’ to a ‘market’ contract. This saving depends on where you live and your electricity use. Consider carefully which is best for your household because if you choose the wrong market contract for your household you can end up paying more. If you have solar panels this may affect the range of offers available to you.

Customers can save by changing!

<table>
<thead>
<tr>
<th>STANDING OFFER</th>
<th>MARKET OFFER*</th>
<th>SAVINGS</th>
</tr>
</thead>
</table>

* See your retailer for Term Fees noting the rules on term fees differ from State to State.

If you are shopping around for the first time it may be worth looking at information available from...
Energy Made Easy or resources from retailers, amongst other sources. Many community organisations offer financial counselling services that may be able to assist you to better understand the range of energy offers and what you should be looking for when comparing these offers.

7. How do I know what price I am paying for electricity?

Another important part of your bill is the price that you are paying for your electricity usage. This is called the tariff or rate in your contract.

The most common are:
- A ‘Flat rate tariff’ is a simple way of charging you for electricity that means you will be charged the same rate for your electricity use all day.
- A ‘Time-of-use tariff’ is a way of charging you a different price for electricity depending on the time of day it is used. This may mean you are charged a lower price when you use your electricity outside ‘peak hours’. For many people this will help you save on your electricity bill.

If you are on a time-of-use tariff you can try to move your heavy usage to a cheaper time. To move your usage you might turn on your dishwasher and washing machine just before bed instead of after dinner. The prices for each time period will be listed in your contract, or you can check with your electricity retailer.

- Other tariffs. There are other tariff structures which electricity companies can offer. Some states and territories also have specific tariffs for different customer groups. As the electricity market changes different tariffs may become available. It is worth considering which tariff best suits your particular needs.

It is important to consider which tariff is most suitable for the way that you use electricity.

8. I am having trouble paying my bill. What can I do?

Payment options can be negotiated with your electricity retailer. For further information see Factsheet 3.
REDUCE YOUR ENERGY BILLS

Power prices are in the news, prompting some households to take a fresh look at energy consumption. The good news is there’s plenty you can do to lower your bills by changing how and when you use energy, and by shopping around for an energy contract which suits your needs. This guide from the website Your Energy Savings is about the choices available to you.

Every household situation is different and the changes for each household will be different. So the best place to start is by understanding how much energy you use each day (and when), as well as which energy saving actions will have the biggest impact in your home.

The things to consider include:
- The size and features of your home
- The energy efficiency of your appliances
- Your lifestyle and the times of day you use most power at home
- The way you manage and use the equipment around your home
- Your choice of energy retailer and energy contract.

ABOUT YOUR ELECTRICITY BILL

Your electricity bill is made up of a number of costs. Electricity retailers generally bill you in two ways – with fixed charges and variable charges. The variable part of your bill you are able to influence directly (for example by changing how and when you use power) and by which energy contract you choose.

The fixed charge is a flat daily fee that your retailer charges you to cover costs associated with having an active electricity connection.

Costs shared by all network users also affect your bill. They include network costs – the poles and wires that get electricity to your home – which make up about half of total electricity costs.

Network costs have been driving up electricity prices in recent times, largely due to the need to maintain and upgrade existing ageing infrastructure and also to ensure the network can meet demand at peak times (when everyone is using electricity).

Recent market reforms are working to reduce network costs. By reducing consumption at peak times households can also contribute to a reduction in future network costs, by helping avoid the need for further network upgrades.

You can continue to make energy savings in your household by following some of the ideas in this guide and reducing your use.

HOW TO START SAVING!

This guide has been designed to give you the big picture as well as some of the nitty-gritty facts on energy consumption so you can make better choices starting today.

Follow our three steps to start saving:
- Get informed. Find out how much you can save, what’s behind energy price increases as well as the key home and lifestyle factors affecting your bills.
- Get organised. Manage your energy use by understanding your energy bill and identifying energy hot spots around the home so you know where to start.
- Get moving. Compare electricity and gas retailers in your area, and decide whether time-of-use pricing, off-peak hot water, and smart meters are for you. Select energy-efficient appliances and follow our checklist of no-cost energy saving actions you can take now.

HOW MUCH CAN YOU SAVE?

By using energy wisely and adopting energy-saving measures, you can save money and cut down on energy wastage at home while meeting your needs for convenience and comfort.

Whether it’s washing clothes in cold water, adjusting your thermostat or turning off power at the wall – it all adds up. An average family of four could be saving hundreds of dollars a year by making just a few changes.

The following simple actions could save a household of four more than $880 over the course of a year.
- Washing clothes in cold water rather than hot could save around $133 a year.
- Getting rid of the second fridge, if you’ve got one, could save around $155 a year.
- Switching off the game console after use could save up to $175 a year.
- Using the clothesline once a week instead of using the dryer could save around $70 a year.
- Installing a water-efficient showerhead could save you up to $350 a year on energy and water.

These amounts are a guide only. Exact savings will vary depending on the age of your appliances, the size of your home, the climatic zone you live in, and the energy prices you pay, including the type of energy contract you choose.

If you need to upgrade a major appliance, buying an energy-efficient one is often a worthwhile investment over the life of your product. By replacing your electric storage hot water system with a solar hot water system or a heat pump water heater, you could make significant savings on your energy bill. The amount you save depends on your individual circumstances.

WHAT DIFFERENCE CAN I MAKE?

Every household that takes action large or small is not only helping their hip pocket, but also contributing to Australia’s efforts to tackle climate change.

Households produce 21 per cent of Australia’s...
carbon emissions. That means the average Australian household creates around 14 tonnes of greenhouse gases a year, including private transport use and the decay of household waste in landfill.

**WHAT’S POWERING THE PRICE RISES?**

Electricity prices have risen significantly over the past eight years largely due to increases in network costs. However prices are expected to flatten out over the next few years. The ‘network’ is the transmission and distribution system of poles and wires that carries electricity to your home. The repair and replacement of ageing poles and wires, increased peak demand (periods placing the highest demand on the energy network – such as hot summer days), population growth, and rising standards for power reliability have all contributed to network cost increases.

Over the long term developments in electricity delivery will give us a more reliable, modern and efficient power industry and help to build a secure energy future for Australia. The Australian Government has produced a series of fact sheets to help you understand electricity costs and what’s causing the changes in more detail.

While a range of factors will continue to affect electricity prices, you can influence how much you pay by reducing your energy consumption and choosing the best contract for your circumstances.

Reducing your energy use will help to counter rising electricity costs. The impact on your bill will depend on the changes you make coupled with the impact of any price changes. Regardless of whether your bill reduces overall, it will be less than if you had done nothing (and far less than if you had increased your energy use).

**Changing gas prices**

Retail gas prices are changing. Households need to carefully compare electricity and gas prices in relation to their particular circumstances to make informed decisions about reducing their energy bills.

The decision on whether the use of gas or electric appliances will minimise energy costs will depend on a number of factors including:

- Where you live and the energy supply options available
- How much gas you use
- Your gas tariffs (some gas tariffs are tiered and decrease in price when households use more gas)
- The number of gas appliances you have (heating, hot water, cooking)
- How old your existing appliances are and the upfront costs of replacing one or more appliances
- How much alternative electric products cost to purchase and run
- Connection fees and charges.

As with electricity, households should shop around to see if a better energy deal is available in their area (see ‘Making the switch’ on the next page). Particularly if you have been on the same contract for some time, there may be a number of different offers that may better suit your circumstances and help to reduce your energy costs.

**KEY FACTORS IMPACTING YOUR HOUSEHOLD’S ENERGY BILLS**

A range of factors determine the amount of energy used in individual households. Some reflect changing personal preferences – such as the increase in home entertainment and technology products – while others relate to the climate and the type of housing where you live.

The main factors affecting your energy use include:

- The local climate where you live
- The total size of your home – and whether it’s a townhouse, apartment or freestanding home
- The design of your home – orientation and whether passive heating and cooling opportunities are used
- Features and appliances – the size, number and energy efficiency of your major appliances
- Habits and personal preferences – the behaviour of the people in your house including how much heating, cooking, showering, washing and clothes drying is done.

Some features in your present home (such as size and orientation) you are stuck with, but you can still take advantage of local conditions and make your home function as efficiently as possible – look at our tips for heating and cooling to get some smart ideas.

If you’re planning changes to your home, or building a new one this is the most effective time to consider energy (and water) efficiency.
MANAGE YOUR ENERGY USE

If you don’t know where and when your household is using energy, it’s difficult to make decisions or prioritise actions that might reduce your costs. The best way to manage your energy use is to measure it. Your energy bill is your best friend when it comes to this as it contains the information you need to monitor how much gas or electricity you are currently using.

- **Get to know your energy bill.** Understanding your energy bill including all the fine print will help you to assess your energy use patterns and levels so you can begin to make changes and savings – around the home.
- **Do some simple comparisons.** For example, by comparing your use from the same period in the previous year, you can get a picture of your energy consumption in different seasons. If your use is higher in winter or summer, you might want to look at the reasons and some options for reducing it.
- **Consider the times of day when your household uses the most energy.** This will be an important guide in selecting the right energy contract. Are you home during the day or does your family arrive home together and turn on heating or cooling, cook dinner, watch TV, go online and do homework?
- **Change when you consume energy away from peak times.** For example by running your washing machine late at night you may be able to choose a contract that rewards this change.
- **Take action at home.** If you know your bills are always high in winter you could look at a mix of options to reduce your energy costs. This might include using thicker bedding so you don’t need to leave heating on overnight, heating only the rooms you are using, stopping up draughts and cracks with simple window and door tape, and investing in a more energy-efficient heater if your current model is guzzling too much energy. If your bills are consistently high in summer and you are a pool owner there are steps you can take to reduce your pool pump running times and pool-related energy use.

IDENTIFYING ENERGY HOT SPOTS AROUND THE HOME

To reduce your electricity and gas bills it helps to know about the major sources of household energy consumption and where your household fits in.

The major sources of energy use around the typical Australian home are spread across heating water, heating and cooling and refrigeration and other electrical appliances. Standby power, lighting and cooking make up most of the rest of your household energy bill. Growing sources of energy use around the home include air conditioning, entertainment systems, computers, pools and spas, and outdoor lighting.

To make the biggest impact on your energy use and costs:

- Target the biggest sources of energy use around your home first – such as hot water and heating and cooling.
- Identify ways you can carry out household functions more efficiently. This includes correct installation and placement of equipment, and keeping it well maintained.
- Look for the no and low cost changes, easy and high impact changes you can make easily and start there.
- When replacing or upgrading household items, consider the most energy efficient option you can afford. This will reduce the power needed to run the product over its lifespan.
- Think about which personal preferences or habits could be affecting your energy use – and include these as part of your planning. Remembering to close doors, switch off lights, or pull on a jumper before turning up the thermostat are some examples.

MAKING THE SWITCH – COMPARE ELECTRICITY AND GAS MARKET OFFERS IN YOUR AREA

One way to reduce your electricity and gas costs is to shop around to see if you are getting the best deal for your particular energy needs. In most areas except Tasmania, the Northern Territory, Western Australia, and areas outside South-East Queensland, you have a choice of which electricity retailer to go with. It’s
Important to note that even in areas where there's only one electricity retailer there will still be a number of energy contracts to choose from. So no matter where you live it's important to make sure you are on the contract that is most suitable for your particular needs.

EnergyMadeEasy.gov.au lists a range of calculators or estimators to help with finding the best option for your household. These tools allow you to compare electricity and gas contracts available from licensed energy retailers. They can help you estimate your annual energy costs under each contract. You'll need access to your previous electricity and/or gas consumption information. If you don’t have previous bills available – your current energy retailer can provide you with this information.

Keep in mind that the calculators are intended as a guide only. It’s important to consider the recommendations against your particular household circumstances and any exceptions that might apply. Be aware that some of the non-government comparison services receive a commission for transferring customers to an electricity or gas retailer with whom they have an agreement.

You can follow our checklist for comparing offers and use the comparison tool for your state or territory to help you make your decision. Visit EnergyMadeEasy.gov.au for more information and to find out the average electricity usage for a household of your size in your area.

If you choose an energy contract where you’re rewarded for moving some of your energy away from peak times you may be able to maximise savings. It’s important to be aware, however, that if you choose a contract that does not suit your household or lifestyle, you could end up paying more.

Keep in mind, switching providers can help to lower your contract costs but it won’t lower your energy use.

Managing your bills
You can ask your energy retailer to set up regular payments towards your bill, so it’s easier to budget, especially if you’re on a fixed income. Or you can ask for a more frequent billing cycle and pay monthly instead of every three months. While this won’t reduce your bill it can make it easier to manage your energy budget and avoid surprises when your bill arrives. Many retailers offer discounts for on-time payments so make sure you check if this option is available.

If you have a dispute regarding a bill there are a number of services available to assist you. These include Energy and Water Ombudsman services (see Resources and assistance section) each state and territory. The first step, however, is always to try to resolve the issue with your retail energy provider. The fact sheet (Fact sheet 3 – Your Rights as an Energy Customer) helps to explain your rights as an energy customer in more detail.

AVOIDING THE PEAK: STOP YOUR BILLS CLIMBING
Under some contracts, energy can cost you less if you use it outside the peak times – usually after 10pm. For some households this can be an effective way to reduce energy bills. To take advantage of reduced tariffs or costs you need to have access to off-peak hot water or time-of-use-pricing.

Off-peak hot water
Hot water makes up 25 per cent of household energy use in the average home, so switching an existing larger electric storage hot water system to an off-peak tariff can save you money on your energy bill. With an off-peak storage hot water system your water is heated during the cheaper, off-peak period of the day and stored for use when you need it. It’s only available with some electric hot water systems and through some providers so you’ll need to check with your energy retailer to see if your household can access this option. It’s important to note that using off-peak hot water doesn’t reduce your hot water use so it doesn’t help to reduce greenhouse gas emissions.

If you’re considering upgrading your hot water system our hot water information can help you choose the most effective system to save you energy and money.

Time-of-use pricing
There is increasing choice in how you buy energy, and how this is calculated. Over time your bill is likely to change from focusing on how much energy you use across a billing period, to how much demand your household places on the network during peak times of the day. It’s in your interest to be on the contract that gives you the lowest bill. This will be the one that best matches your overall use and time-of-use pattern. You should check your bills every so often to confirm that you are still on the best offer for you.

Depending on where you live, there are a number of tariffs available that can help you save if you can reduce your energy use at peak times. Time-of-use pricing arrangements (also known as demand-based tariffs) mean that the cost of your energy varies depending on what time of day you use it. Time-of-use tariffs are often divided into two or three periods – peak, shoulder and off-peak. The exact time periods these cover are determined by individual energy retailers, so you’ll need to check the specific times when you sign up.

Before making a decision to move to a different billing arrangement, you need to look carefully at your household’s timetables and energy use to see whether time-of-use pricing will work for you. To access time-of-use pricing you will also need to have an interval or ‘smart’ meter installed.

These new electronic meters measure your energy use in half hour intervals. With traditional meters you can’t tell how much energy you are using until your bill arrives, but smart meters can be linked to a range of monitors and displays that make your energy use patterns more visible. This information can help to inform your household’s habits and help you use energy at cheaper times of the day. Contact your energy retailer to see if you can access this option.
CHOOSE AND USE ENERGY-EFFICIENT APPLIANCES

The price tag doesn’t tell the whole story when weighing up the cost of your new television, refrigerator or washing machine. If you take into account that all the appliances you have at home take up around 30 per cent of your total energy bills, looking at running costs like a ‘second price tag’ and choosing products accordingly will save you a considerable amount of energy and money over time.

- Many appliances that have a less expensive purchase price may end up costing you far more in energy costs over the lifetime of the product. Choose appliances and technologies that suit your needs and that use the lowest number of watts or megajoules. Avoid the lure of upgrading to bigger products or those with more features you may never use and which can lock you in to costs for years to come.
- Compare the Energy Rating Label found on appliances including including televisions, computer monitors, dishwashers, washing machines, refrigerators, freezers and clothes dryers and go for the product with the highest number of stars. To make this easy there’s an Energy Rating App for all types of phones, or go to the Energy Rating website and compare the efficiency of appliances. There is also a Voluntary Labeling Program for pool pumps – the more stars, the less energy the product will use.
- Gas appliances are not regulated for energy efficiency in Australia. Labels that appear on some appliances (space heaters, ducted heating and water heaters) are part of an industry-led voluntary Gas Energy Rating Label not monitored by government.
- For those products without energy ratings, you can find out how much energy they use and compare this with a product of a similar size or capacity and which manufacturers include energy saving features in their products. You could also check to see if the product has the blue ENERGY STAR® mark.
- For appliances and technology you already have at home, you may want to identify which ones are the biggest energy users by using a simple calculation to estimate the running costs and then consider how you save money by using them more efficiently.
- Install your appliance so it runs efficiently and at optimum levels. For example, fridges should not be placed next to ovens or warm spots as they’ll need to work harder to stay cool. Proper use and maintenance is also important, for example, allowing heated food to cool before placing it in the fridge and repairing seals on your fridge door so cold air doesn’t leak out. Read the instructions for individual appliances before you install them to ensure you position and use them correctly from the start – saving you time and energy.
- Use thermostat controls to minimise energy use and still achieve home comfort. Spend some time reading the manual so you know how to turn on these features if they’re not the default setting.
- Operate the appliance for the shortest amount of time possible and turn it off at the wall when you’re not using it. This includes turning off computers, screens and other office and home entertainment products such as printers and speakers (with the exception of appliances like refrigerators and some medical equipment which needs to stay on all the time).

CHECKLIST: START SAVING!

5 ways to reduce your energy bill now that won’t cost a thing

- Hot water – potentially the single biggest source of energy use in your home. Wash clothes in cold water and only wash full loads. Run the dishwasher only when it’s full and scrape plates first then cold water rinse if they need it. Fit a low-flow showerhead (it’ll pay for itself in no time) and take shorter showers.
- Climate control – heating and cooling are usually the next biggest energy guzzlers. In winter, set your heating thermostats between 18 to 20 degrees Celsius. In summer, set your cooling thermostats between 25 to 27 degrees Celsius. Every extra degree increases your heating and cooling energy use by between 5 and 10 per cent. Close internal doors and only heat or cool the rooms you are using.
- Window watch – up to 40 per cent of the heat in your home could be leaking out your windows. In winter, open curtains to let the sun in and close curtains before it gets dark to keep the heat in – especially while your heater is on. In summer, close curtains during the hottest part of the day. At night you can open curtains and windows to let warm air out and cool breezes in.
- Use appliances wisely – they could be responsible for as much as 33 per cent of your energy bill. Turn off additional fridges and freezers when not needed and think about getting rid of these. Use lids on pots while cooking, fill the kettle and pots with only as much water as you need. Reduce pool filter running time to the safe minimum set out in the manual. Dry clothes on the line not in a dryer – it’s free!
- Turn it off at the wall – standby power can account for more than 10 per cent of your household electricity use.

Any items with a little light on or clock are using power, and your mobile phone charger is drawing power even when your phone is not plugged in. Turn off appliances at the wall when you’re not using them – it’s a very easy way to save energy. Consider smart power boards and take control of your technology.

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WORKSHEETS AND ACTIVITIES

The Exploring Issues section comprises a range of ready-to-use worksheets featuring activities which relate to facts and views raised in this book.

The exercises presented in these worksheets are suitable for use by students at middle secondary school level and beyond. Some of the activities may be explored either individually or as a group.

As the information in this book is compiled from a number of different sources, readers are prompted to consider the origin of the text and to critically evaluate the questions presented.

Is the information cited from a primary or secondary source? Are you being presented with facts or opinions?

Is there any evidence of a particular bias or agenda? What are your own views after having explored the issues?

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Brainstorm, individually or as a group, to find out what you know about waste recycling and energy saving.

1. What does the term ‘recycling’ mean, and why is it important?

2. What is renewable energy, and what are some examples?

3. How is energy used in households, and what are some examples?

4. How is climate change linked to energy use?
Complete the following activity on a separate sheet of paper if more space is required.

Understanding how you use energy and how you manage waste in your home can help to reduce household costs as well as reduce your impact on the environment.

Compile a list of ways you currently manage waste and energy use in your home. Once you have completed your list, address ways in which you could improve your energy and waste management. Compare your conclusions with others in your class and collate everyone’s findings to discuss.

**WASTE MANAGEMENT**

*If each person changes the way they think and act, the production of waste can be reduced.*

**ENERGY MANAGEMENT**

*Understanding your electricity bill will help you to manage your usage and how much you pay. You can reduce some of your costs by changing how you buy or how you use energy at home.*
Complete the following multiple choice questionnaire by circling or matching your preferred responses. The answers are at the end of this page.

1. Which of the following are examples of e-waste? (select any that apply)
   a. Glass
   b. Printers
   c. Computers
   d. Mobile phones
   e. Paper
   f. Plastic bags
   g. Batteries
   h. Cardboard

2. Which of the following can be placed in compost? (select any that apply)
   a. Fruit
   b. Fish
   c. Tea bags
   d. Vegetables
   e. Shredded paper
   f. Plastic bags
   g. Dairy products
   h. Plants

3. Which of the following terms are used to measure energy? (select any that apply)
   a. Gram
   b. Megawatt
   c. Kilometre
   d. Tonne
   e. Millisecond
   f. Terawatt
   g. Megabyte
   h. Petajoule
   i. Litre

4. Which of the following are types of plastic? (select any that apply)
   a. Polyethylene Terephthalate
   b. High Density Polyethylene
   c. Chlorine
   d. Petroleum
   e. Low Density Polyethylene
   f. Polypropylene
   g. Polystyrene
   h. Aluminium

MULTIPLE CHOICE ANSWERS
During 2010-11, the Australian economy generated 53.0 million tonnes of waste, including imports (ABS, Waste Account, Australia, 2010-11). (p.1)

In 2010-11, the largest reductions in waste materials sent to landfill were masonry, and paper and cardboard. Plastic waste sent to landfill increased from 1.2 million tonnes in 2009-10 to 1.9 million tonnes in 2010-11 (ibid). (p.2)

Between 2006-07 and 2010-11, waste recycling per capita in Australia rose by around 20% over the period, or 4.6% per year, from around 1.0 tonne to around 1.2 tonnes per capita per year (Department of the Environment, National Waste Reporting 2013). (p.4)

Between 2006-07 and 2010-11, the total quantity of material recycled in Australia increased significantly from 21.4Mt to 27.3Mt per year, or by about 27% in 4 years (ibid). (p.4)

In 2015, outdoor transport locations recorded the highest average number of rubbish items per site of 604, which is a dramatic drop on 2014 when this location reported an average count of 9,210 (Clean Up Australia Day, 2015 Rubbish Report – National). (p.6)

Australians dispose of 90% of their glass in recycling bins, but less than half of this can be used in recycling (Department of Industry, Innovation and Science, Recycling). (p.8)

The more we recycle paper and cardboard, the less we need to use natural resources like fibre from trees to manufacture new products. It also uses less energy and water in manufacturing (ibid). (p.9)

By minimising waste by avoiding and reducing waste, and reusing and recycling, we can cut waste by up to 50% – and even more if we compost (DEHP, Reduce, reuse, recycle). (p.12)

On average Australians throw away around 21 million tonnes of waste per year (Department of Industry, Innovation and Science, Reducing waste). (p.16)

Around two thirds of waste sent to landfill is from organic material like food scraps, paper and garden waste. When organic waste decomposes in landfills, it produces a gas known as ‘landfill gas’ which consists of about 55% methane (ibid). (p.16)

Plastic bags can become serial killers. Once a bag is ingested, the animal dies and decomposes, releasing the bag back into the environment to kill again (Clean Up Australia Ltd, Say NO to Plastic Bags). (p.18)

An estimated 1 trillion plastic shopping bags are discarded globally every year, or 7,150 every single minute in Australia (van Kernebeek, J, Plastic is not always fantastic). (p.20)

88% of the 4 million computers and 3 million TVs bought in Australia every year will end up in landfill (Clean Up Australia Ltd, E-waste). (p.22)

Electronic waste is responsible for 70% of the toxic chemicals such as lead, cadmium and mercury found in landfill (ibid). (p.22)

Electronic waste is piling up around the world at a rate of 40 million tonnes per year (ibid). (p.22)

In Australia we waste up to 30% of the food we purchase (Department of Industry, Innovation and Science, Minimise food waste). (p.24)

In NSW alone, the average household wastes up to 315 kg of food a year, at a cost of just over $1,000 (ibid). (p.24)

Over 97% of households across Australia practise recycling and reusing. But that still leaves almost half of all garbage that ends up in landfills every year (Cane, S, Waste: Towards Zero Waste). (p.29)

While energy use affects household and business related costs, it also impacts the environment, accounting for more than three quarters (77%) of Australia’s total greenhouse emissions in 2009 (ABS, 4102.0 – Australian Social Trends). (p.31)

The majority of energy consumption in Australia is by industry, accounting for nearly three quarters (74%) of total net energy consumption in 2009-10 (ibid). (p.31)

Between 2001 and 2011, the number of households installing solar energy units greatly increased, rising from 118 in 2001 to 85,550 in 2009, before sharply increasing to 639,803 in 2011 (ibid). (p.34)

Energy production fell by 4% in 2013-14, as lower uranium and oil production outweighed growth in black coal (Department of Industry, Innovation and Science, 2015 Australian energy update). (p.37)

Renewable energy generation rose by 12% in 2013-14, comprising 15% of total generation in Australia (ibid), (p.37)

Australian households are directly responsible for about one-fifth of Australia’s greenhouse gas emissions (McGee, C, Energy). (p.38)

Heating and cooling accounts for 40% of household energy use, making it the largest energy user in the average Australian home (ibid). (p.38)

Heating water accounts for 21% of the energy used in the average Australian home, and is the largest single source of greenhouse gas emissions (approximately 22%) from home energy use (ibid). (p.39)

75% of energy in Australia is produced by the burning of coal, which releases carbon dioxide: a greenhouse gas (Clean Up Australia Ltd, Energy Conservation Fact Sheet 2015). (p.41)

The coal export industry in Australia was worth 40 billion in 2013/2014 (ibid). (p.41)

The Australian residential energy consumption is expected to rise by 56% of 1990 levels by 2020: an increase of almost 4 million households (ibid). (p.41)

Australia’s main renewable energy sources are: hydro 45.9%; wind 30.9%; solar 15.3%; and bioenergy 7.6% (ibid). (p.42)

Fluorescent lights are the most energy efficient of all light sources (ActewAGL, Energy saving tips for home). (p.43)

Microwaves cook food 3 times faster than standard full-size ovens, saving up to 70% of electricity used for cooking (ibid). (p.44)
Alternative energy sources
Energy sources different from those in widespread use at the moment (which are referred to as conventional). Includes solar, wind, wave, tidal, hydroelectric and geothermal energy. Although they each have their own drawbacks, none of these produces significant air pollution.

Biodegradable
Materials capable of being decomposed back into the environment by natural biological processes.

Climate change
A change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer.

Coal
A fossil fuel formed over millions of years from decomposing plants. Most of the electricity generated in Australia comes from burning coal. When burned coal produces large amounts of carbon dioxide, one of the gases responsible for the greenhouse effect.

Composting
The biological process that converts organic material into a useful soil additive. The process diverts organic material from landfill and so prevents the production of methane (a powerful greenhouse gas).

E-waste
End-of-life electronic equipment, such as televisions, computers, mobile phones, stereos and small electrical appliances (but not whitegoods).

Fossil fuels
Sometimes called non-renewable resources because they take millions of years to form, and reserves are being depleted much faster than new ones are being formed. The most common forms are coal, oil and natural gas.

Greenhouse gases
Gases in the atmosphere, such as water vapour, carbon dioxide, methane, ozone, hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride and nitrous oxide that create a greenhouse effect, trapping heat near the Earth's surface.

HDPE bags
High-density polyethylene ‘singlet’ bags are the thinner bags used by over 80% of retailers, but predominately in supermarkets. These bags are easily recycled, yet rarely are.

Landfill
An area of land that is designated to contain waste. Waste is deposited in layers, then compacted and covered.

LDPE bags
Low-density polyethylene bags are the much thicker bags used by boutiques and department stores. These bags are recyclable, although there are few collection points.

Natural gas
Colourless gas used as fuel in the generation of electricity, in the production of mechanical energy or in heat.

Non-renewable energy
An energy resource which is being used faster than it can be replaced and which will eventually run out.

Organic waste
Separated food and/or ‘green’ material (e.g. grass clippings or vegetation prunings).

Recyclable material
Made from material that can be recycled, for example, rigid plastics.

Recycled material
Made from materials that would otherwise have become waste.

Recycling
Set of processes (including biological) for converting materials, that would otherwise be disposed of as wastes, into useful materials or products.

Reduce
‘Reduce’ is a method of better using our planet’s limited resources by reducing or cutting down on the amount of materials or products we use. For example, we can reduce cartridge waste by cutting back on the amount of printing we do and therefore the number of printer cartridges we use.

Remanufactured material
Products with remanufactured material have new and re-used parts or materials. For example, old or damaged parts of a product may have been replaced so that the product can have a second life.

Renewable energy
Energy derived from sources that cannot be depleted or can be replaced e.g. wind, solar, biomass, wave or hydro.

Reuse
Repeated use of a product in its same state with minimal processing. Examples include the reuse of milk cartons as seedling guards for tree planting or the reuse of shopping bags (preferably biodegradable) as bin liners.

Reused material
Material in the product has been used more than once and could possibly be used again and again.

Solar energy
Solar energy is light and heat energy from the sun.

Waste
Any unwanted by-products of mining, manufacturing, processing, day-to-day living and working and other human activities. Generally, these are the materials for which we have no further use and wish to dispose of.

Waste management
Organised management of waste generation, collection, treatment and disposal practices.

Wind farm
An array of wind turbines located in proximity to one another and generally using the same substation (transformer) and power line to connect to an electricity grid.
Websites with further information on the topic

Australian Bureau of Statistics  www.abs.gov.au
Australian Conservation Foundation  www.acfonline.org.au
Australian Council of Recycling  www.acor.org.au
Australian Institute of Energy  www.aie.org.au
Beyond Zero Emissions  www.bze.org.au
Clean Energy Council  www.cleanenergycommission.org.au
Clean Up Australia  www.cleanup.org.au
Department of Industry, Innovation and Science  www.industry.gov.au
Friends of the Earth Australia  www.foe.org.au
Greenpeace Australia Pacific  www.greenpeace.org.au
International Energy Agency  www.iea.org
Planet Ark  http://planetark.org
Sustainability Victoria  www.sustainability.vic.gov.au
Waste Authority WA  www.wasteauthority.wa.gov.au
WWF-Australia  www.wwf.org.au
Your Energy Savings  http://yourenergysavings.gov.au
Zero Waste SA  www.zerowaste.sa.gov.au

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➤ Your Energy Savings
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