



## Energy Issues



Fossil fuels were created from animals and plants that lived millions of years ago. Their remains were buried under sediment at the bottom of ancient lakes and oceans before they decayed. Over time, the remains became buried deeper and deeper, and pressure and heat over millions of years changed the remains into gas, oil and coal – materials we now call fossil fuels. These fuels are not replaceable within human timeframes (i.e. they are known as ‘non-renewable energy sources’).

Burning fossil fuels causes air pollution and contributes to the greenhouse effect. Fortunately, clean and renewable sources of energy, such as wind and solar, are becoming more and more economically possible. Renewable energy sources are those replaced within a reasonable time frame by natural processes. These sources of energy do not create as much pollution and use resources that we are able to keep using – like the sun and wind. Energy created from renewable resources is sometimes called ‘green power’ or ‘green energy’.

We can all play a part in reducing energy use by catching public transport, riding a bike, car-pooling, buying more efficient cars and appliances, and choosing to buy green power.

**“ Burning fossil fuels causes air pollution and contributes to the greenhouse effect. ”**

## Trends



The amount of electricity used in South Australia is **increasing**.



The total amount of energy used has **increased slightly**.



The proportion of South Australia's energy powered by renewable energy is **increasing** from less than 1% in 2002 to a predicted 20% in 2008/09 by the time wind farms under construction are completed.



Emissions from the stationary energy sector (eg electrical power generation stations) are **stable or slightly increasing**.

**Energy**



**What is the Current Energy Situation?**

**Energy sources – where does our energy come from?**

In South Australia, most of our energy is produced from fossil fuels, using crude oil, gas and coal. Combustion of hydrocarbon fuels such as these, results in large amounts of greenhouse gas emission, primarily as carbon dioxide. Coal and oil release more emissions than the combustion of gas. The proportion of energy from biomass and biogas in the residential, manufacturing and energy sectors has been declining since 2000/01. Biomass is plant or animal matter, (either living or dead) which can be used as a source of energy. While biomass and biogas are hydrocarbon fuels, they can be classed as renewable.

Since 2001, primary energy use in South Australia has grown slightly, but electricity use has grown more rapidly, at approximately 10%. This growth in energy has resulted in greenhouse gas emissions increasing slightly. This trend will continue unless low emission and renewable energy alternatives are used more often and energy efficiency measures are adopted.



**Pressure indicators**

**The amount of energy from non-renewable resources**

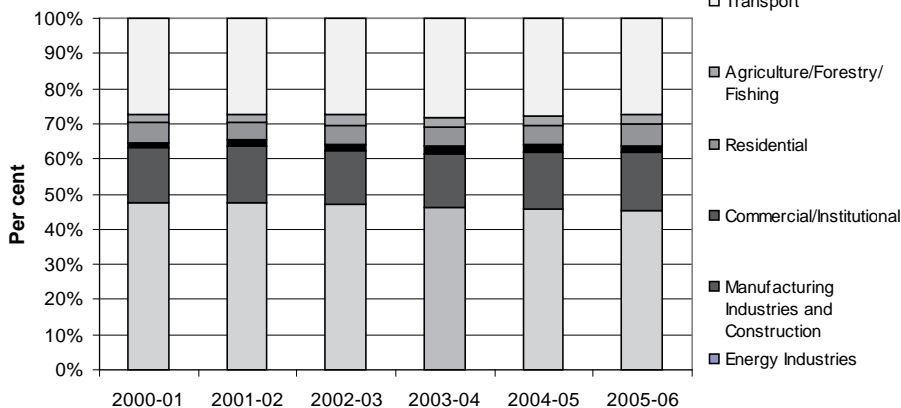
South Australia's main sources of energy are oil, natural gas and coal with oil being the largest single source. Energy is then delivered to South Australians as final energy, mainly in the form of petroleum, electricity and natural gas. Virtually all of the oil used in South Australia is made into petroleum for use in the transport industry.

Turning coal into electricity involves major losses of energy in the generation process.

**Total amount of energy used, and by whom?**

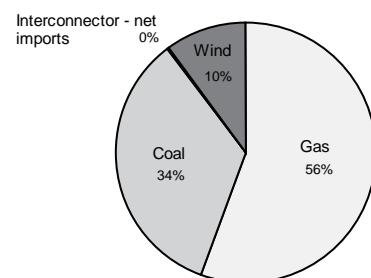
South Australia has high levels of energy consumption per person by world standards, and nationally, Australia has the highest per person consumption in the world. Transport and energy industries together make up over three quarters of total energy use.

**Primary energy use in South Australia by sector**



Source: Department of Climate Change

**South Australian electricity generation by fuel type in 2006/07**



Source: Electricity Supply Industry Planning Council 2008

**Energy**



**Responding to Energy Issues**

**Response indicators**

**The amount of energy used from renewable resources**

Renewable energy includes sources of power that are replaceable within a reasonable timeframe. These include sources of power that come from the wind, sun, plants and animals, and heat stored underground (geothermal).

**Wind**

Since 2002, six wind farms have been built and another three wind farms are under construction across the state. Seven percent of South Australia’s electricity was generated by wind farms in 2006/07, and this is likely to increase as further wind farms are completed.

**Solar**

Solar energy is obtained from the sun. It can be captured and stored as heat energy, or be used to produce electricity from photovoltaic cells (electricity from sunlight). These cells can generate electricity for home use and any excess electricity can be fed into the main electricity grid for others to use. South Australia has a Solar Schools program and by August 2007, 110 schools had solar power installed. The state has set a goal for at least 250 schools to have solar power within 10 years. South Australia currently has approximately 44% of Australia’s total grid-connected solar capacity, but solar hot water systems are still the most popular use of solar energy so far.

**Plant and animal material (biomass)**

Biomass is plant or animal matter, either living or dead. There are many forms of biomass that can be used to produce energy including wood, sewage sludge, livestock waste, specially grown energy crops, woody weeds, food industry waste and landfill waste. SA Water uses electricity generated from biogas plants at Bolivar and Glenelg.

**Geothermal**

Geothermal energy is heat energy stored deep underground. In the Cooper Basin of South Australia, research is being carried out for the possible development of a geothermal electricity plant using hot, dry rocks. This technology involves the drilling of bores into which water is pumped. The water is heated by the rocks below, converted to steam, and then piped back to the surface to drive turbines that produce electricity. Geothermal energy is not yet harvested commercially in Australia, but there are many geothermal exploration projects underway.

**“The state has set a goal for at least 250 schools to have solar power within 10 years.”**





### Taking Action for Energy

- Turn off your lights at home when you are not in the room.
- Take stock of the appliances and equipment in your house. How energy efficient are they?
- Investigate the potential to install a solar powered hot water heater in your house.
- What are some of the ways that you can help your school to become more energy efficient?

## Impacts of Using Fossil Fuels for Energy



### Atmosphere

- The use of fossil fuels as an energy source makes up a large proportion of our total greenhouse gas emissions.
- Fossil fuels contribute to air pollution that harms the environment and human health.



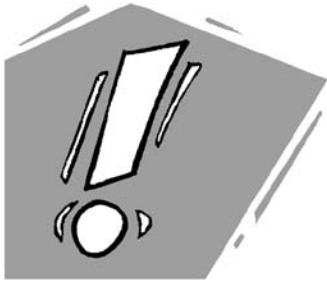
### Coasts and the Sea

- Power stations that create energy also discharge thermal energy into the coastal waters, which can affect the coastal ecosystem.

“ In South Australia, most of our energy is produced from fossil fuels, using crude oil, gas, and coal. ”



Energy



# Attention!!

## Energy use at Home

The amount of energy we are using in our households is increasing. The main sources of energy used in households are electricity, natural gas and wood. Wood is mainly used for heating. Most of the energy in our houses is used for water heating and the running of electrical appliances.

### Energy Terms

**Watts:** A watt is a unit of power or energy per second.

**One kilowatt (kW):** is equal to one thousand Watts.

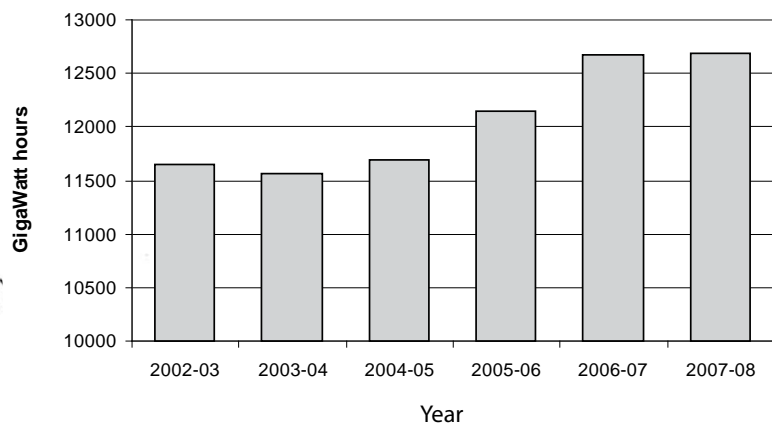
**One megawatt (MW):** is equal to one million Watts.

**One megawatt hour (MWh):** is the energy required to power ten thousand 100W light globes for one hour.

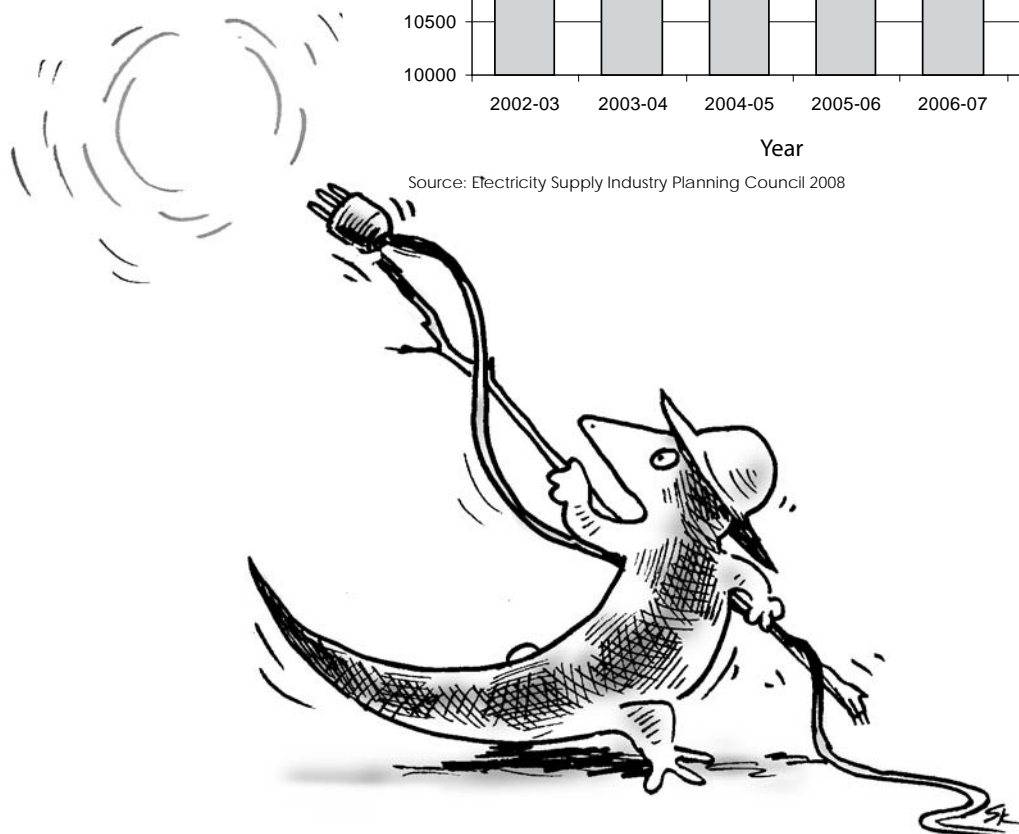
### Green power

Green power is renewable electricity sourced from the sun, wind, water and waste that is purchased by your energy company on your behalf. Buying green power at home reduces your personal greenhouse emissions and helps reduce our reliance on fossil fuel resources. Purchasing green power also encourages new investment in renewable energy. Only renewable energy products that display the GreenPower 'tick' are government accredited and contribute to new investments in renewable energy.

Electricity consumption in South Australia – Total customer sales 2002/03 to 2007/08



Source: Electricity Supply Industry Planning Council 2008





## Research Ideas about Energy

- 1 What are the different types of energy sources used in South Australia?

---

- 2 What is the difference between renewable and non-renewable energy sources?

---

- 3 How has energy use affected the environment in your community, South Australia, Australia and globally?

---

- 4 What does the State of the Environment report tell us about energy use in South Australia?

---

- 5 What might happen in the future if things continue as they are?

---

- 6 How does our energy use influence climate change?

---

- 7 What are government, business and industry doing to address energy issues in South Australia?

---

- 8 What can we do individually, or in communities, to reduce our energy use?

---

### Resources

For more detailed information on the issue and actions you can take see the State of the Environment report for South Australia 2008.

This is available at:  
[www.epa.sa.gov.au/soe](http://www.epa.sa.gov.au/soe)



This fact sheet is part of a set of 20 fact sheets about the key environmental issues identified in the State of the Environment report 2008, produced for the Environment Reporting Education Resource. You can access the fact sheets and learn more about taking action for the environment at the Education Resource website:  
[www.epa.sa.gov.au/soe](http://www.epa.sa.gov.au/soe).  
For more information call the Environmental Education Unit of the Department for Environment and Heritage (08) 8463 3911.