

EMPOWERING CHANGE

clean energy solutions to
climate change



**Friends of
the Earth**
Australia



**AUSTRALIAN
CONSERVATION
FOUNDATION**

being energy smart



The cheapest and quickest way to reduce our greenhouse emissions is by being smarter and more efficient with the way we consume our energy.

Energy savings involves improving industrial processes and the ways we use power to ensure that the least amount of energy is lost. Its like putting a patch on the hole in the fuel tank rather than pouring in ever more fuel.

Energy savings also mean the development and use of more efficient appliances and the smarter design or retro-fitting of buildings to make the most of natural light and climate to reduce or eliminate the need for artificial heating and cooling.

The capture and reuse of waste as fuel is also an important step towards greater energy savings or efficiency.

In the home, saving energy is as simple as adopting more efficient hot water systems like gas-boosted solar or simply turning off electrical

appliances that are on standby - up to 10% of electricity used in Australian houses is used to keep appliances on standby.

Using energy smartly reduces the amount of energy we need and reduces greenhouse pollution. It also saves money. One American study found every dollar invested in energy efficiency is seven times more effective at reducing greenhouse pollution than money spent on nuclear power.

The Australian Ministerial Council on Energy found currently existing efficiency measures could cut energy use in the manufacturing, residential and commercial sectors - where we live and work - by up to 30%. And these efficiency measures would pay for themselves in just four years! Being energy smart is a quick, cheap and clean way to make a real difference on climate change saving power helps buy the time needed to save the planet.

good news

By taking early action on climate change, a number of countries have already succeeded in reducing greenhouse gas emissions. Renewable energy, drawn from unlimited and safe natural sources like the sun and wind, has played a key role in this transition.

Renewable energy is now the fastest growing of all energy industries and is worth \$54 billion each year. Wind power has had an average annual growth of about 25% over the past 20 years, while grid-connected solar power has grown annually by 60% in recent years. The renewable energy industries now employ nearly two million people worldwide.

Australia is well placed to lead the world in the development of renewable energy but our potential to build a clean energy future – and Australian jobs – is being lost through government inaction.



Renewable energy production and targets



solar

All life on Earth depends on the Sun. The amount of solar energy that hits Australia in one day is about half the world's total annual energy use, so the potential of this power source is enormous. Solar technologies harness this energy either directly as heat or for conversion into electricity.



Solar hot water systems are a common example of the use of solar thermal energy. Water heating typically accounts for one quarter of domestic energy bills and a similar proportion of greenhouse gas emissions. Households fitted with solar water heating pay around 50-80% less for water heating than those fitted with electrical or gas systems. However Australia still lags behind countries like Israel where solar hot water is mandatory.

Despite the amount of sunshine Australia enjoys, nations like Japan and Germany are leading the world in solar electricity generation with 80% of the world's installed capacity. By 2001 Japan had 50,000 homes powered by solar electricity and selling the excess power back into the national grid.

According to the Business Council on Sustainable Energy, Australia could supply nearly 10% of its electricity demand from solar by 2020 simply by installing 3kW solar PV systems on one third of Australian households. It makes no sense for a sunburnt country not to embrace solar power.



bio-energy

Bio-energy is energy generated from organic matter. Bio-energy can be used for electricity, heating, cooling and transportation. It can be generated from organic wastes from landfill, gas, and agricultural and forestry wastes, as well as from crops grown specifically for energy generation.

There are many ways to make energy from organic matter. Whether these ways are sustainable depends on the feedstock and the technology used. In the best cases bio-energy crops can contribute to landscape repair by increasing biodiversity and reducing salinity, as well as being 'carbon neutral'.

Bio-energy from unsustainable sources such as old growth forest or palm oil plantations can't be justified on greenhouse benefits, especially since sustainable alternatives exist.

Australia already generates enough electricity from bio-energy to supply all of the homes in Tasmania. By 2020 bio-energy could supply one third of Australia's electricity if it expands at the current 3% average for industrialised countries. This would generate an estimated 250,000 jobs, mostly in rural and regional Australia.

hydrogen

In the long term, hydrogen has the potential to contribute to a clean energy future. It is a very efficient energy carrier and around the world interest in the 'hydrogen economy' is growing. Hydrogen can provide transport, stationary and portable power.

The key question with hydrogen is how it is produced. Production of hydrogen requires large amounts of energy. If that energy comes from renewable power sources, hydrogen is truly clean energy. But if the energy comes from coal or nuclear power, hydrogen is not clean. So it is essential that any promotion of hydrogen occur in the context of a broader clean energy and energy efficiency strategy.

The development of hydrogen also faces issues over cost, storage and infrastructure but hydrogen research and production is likely to grow.

wind



Wind power is the least expensive of the new renewable sources of electricity. Denmark has become a world leader with wind set to generate at least 25% of Denmark's total energy by 2009. Germany has a target of 14% wind energy by 2015. Worldwide there are up to 70,000 people employed in the wind industry. The answer to climate change really is blowing in the wind!

Australia has some of the best wind resources in the world and Australian wind farms already generate enough electricity to supply 250,000 homes. Some of the less windy sites in Australia would be considered good or excellent in Europe, so there is a lot of room to grow.

Generating 10% of Australia's electricity, about what South Australia uses, would only need about 4,200 wind turbines. In comparison, Denmark has more than 5,000 wind turbines and is about two-thirds the size of Tasmania.

A wind farm with 40 turbines would span about 1,000 hectares (10 sq kms), but the actual turbines and access roads would occupy only 20 hectares (0.2 sq kms) with existing activities, such as agriculture, continuing uninterrupted.

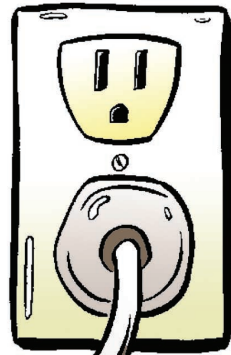
baseload

The management of an electricity grid involves juggling demand and supply to ensure a constant stream of electricity. The amount of electricity consumed most of the time is called 'base-load'. This is punctuated by bursts of higher demand known as 'peak-load'.

Today's commercial renewable energy technologies are mature and reliable with machines built to last for decades with minimal maintenance. Sources like bio-energy and geothermal energy are available on demand while others like wind and solar photovoltaics are more intermittent. Using different power sources and employing energy conservation and efficiency means renewable energy creates a stable energy supply.

An important issue in harnessing renewable energy is making sure the energy is available where and when it is needed. Basing an energy network on a mix of sources ensures a mutually supportive and stable power supply. For example, wind levels do fluctuate but by spreading wind farms across the country the aggregated contribution of all the wind farms adds up to a much smoother and more assured supply than any individual wind farm.

In contrast, large-scale centralised power plants like coal and nuclear require expensive backup in case the entire plant breaks down. Feeding the grid with diverse sources of renewable energy ensures a reliable and resilient system. Gas, particularly the more energy efficient combined cycle turbines, provide a reliable energy source with about half the greenhouse emissions of conventional coal. Gas has an important role to play in assisting the transition from large-scale coal plants to renewable energy.



WRONG WAY GO BACK

coal

Most of our greenhouse gas emissions come from burning fossil fuels like coal, gas and oil. Around 85% of Australia's electricity is generated by burning coal, making Australia one of the highest per capita greenhouse gas emitters in the world.

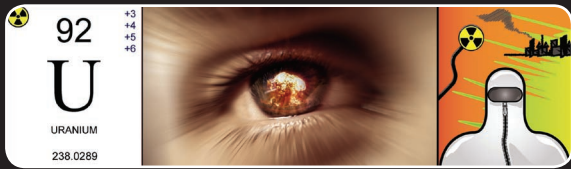
There is a lot of talk about coal carbon capture and storage or 'geosequestration', where pollution from burning coal is captured, piped and stored underground. However this won't be commercially available for another two decades or so and there are many unanswered questions about whether the technology works, who owns the underground reservoirs, what it will cost and who is responsible for making sure the carbon doesn't leak.

Despite this, Australian governments are putting most of their eggs in the carbon capture basket. Given the urgent need for action we simply can't afford to waste more years waiting to see if it even works and we should instead be adopting cleaner, smarter and proven alternatives like energy efficiency savings and renewable energy.

Carbon capture and storage is also likely to be expensive and would burden future generations with thousands of years of management of the stored greenhouse pollution. It may have a role in the future but climate change demands action now if we are to make the dramatic cuts to greenhouse pollution levels the best science is telling us is needed.

Renewable energy and being energy smart provide the most reliable and cost-effective path to a low-carbon future.





nuclear energy

Because electricity generation contributes to only around a third of global greenhouse gas emissions, replacing coal-fired electricity generating plants with nuclear energy would only make a small dent in carbon emissions. Even if nuclear power could be doubled by 2050, greenhouse emissions would only be reduced by 5%. This is less than one-tenth of the reduction required to stabilise atmospheric concentrations of greenhouse gases. Nuclear power is high cost and high risk and it is no solution to climate change because it is:

Too dangerous. Nuclear power carries the risk of a serious accident like Chernobyl and, in an increasingly unstable world, the uranium and nuclear power industries both increase the risk of nuclear weapons proliferation and are themselves a real terrorist threat.

Too dirty. Uranium mining and nuclear power create highly toxic waste that remains dangerous for hundreds of thousands of years. BHP Billiton's Roxby Downs uranium mine in South Australia already has a radioactive waste stockpile of over 70 million tonnes while at SA's Beverley uranium mine radioactive waste is simply dumped into groundwater. Uranium goes on to become high-level nuclear waste at reactors around the world. There is still not a single repository in the world for the long-term disposal of high-level nuclear waste. Nuclear waste means permanent pollution.

Too expensive. Even after more than 50 years of massive government subsidies around the world nuclear power still can't pay for itself. It requires billions of dollars to build and run a plant and more to manage the radioactive waste produced and to decommission the reactor itself when it reaches the end of its life.

Too slow. Even if the Federal Government decided to build a nuclear reactor today it would take at least 10 to 15 years before it would produce any energy – and even longer before it was a net energy contributor. In contrast energy efficiency measures can deliver greenhouse gas reductions today and widespread renewable energy could be up and powering our lives in a year or two.

australian government policy



“We already have the technologies to commence a rapid transition to an energy future based on renewable energy and efficient energy, with gas playing the role as an important transitional fuel. The barriers to this transition are not primarily technological or economic, but rather are the immense political power of vested interests.”

*- Dr. Mark Diesendorf, energy expert at the University of NSW
Institute of Environmental Studies.*

The Federal Government has finally acknowledged climate change is happening but its response is too slow and ineffective. 166 countries, including the big emerging economies of India and China, have ratified the international plan to reduce greenhouse pollution known as the Kyoto Protocol. Australia refuses to be involved in this global movement and is increasingly isolated. The Federal Government provides \$9 billion annually in subsidies to the fossil fuel sector. Even the Government's Low Emissions Technology Demonstration Fund gives most of its funding to support the coal industry instead of the much cleaner renewable energy sector.

Since 1996 the Federal Government has:


- shut down renewable energy research projects in the CSIRO and gagged scientists from participating in public discussion on climate change and energy alternatives.
- blocked wind farm projects in Victoria and WA and, according to the May 19, 2006 *Sydney Morning Herald*, called meetings with coal and uranium miners to develop plans to halt wind developments.
- established a committee called the Lower Emissions Technical Advisory Group that is stacked with members of the fossil fuel industry to help shape Australia's energy and climate policy.
- closed the Energy Research and Development Corporation, a funding body for renewable energy projects, and ceased funding the Co-operative Research Centre (CRC) for Renewable Energy. In contrast, the government funds three CRCs for fossil fuels.

what the government should be doing for a clean energy future:

- C**ommit to dramatic cuts in greenhouse pollution
- L**ead the world's efforts to combat climate change
- E**xtend renewable sources of electricity to industry and homes
- A**dopt world class standards in energy efficiency
- N**ew clean transport alternatives for all Australians

Things you can do:

1. Source your electricity from Green Power – and you can sort the green from the greenwash at <www.greenelectricitywatch.org.au>
2. Conduct an energy audit on your home and figure out how you can save energy: turn off appliances on standby, replace light bulbs with compact fluorescent lights, and use energy efficient appliances. If you own your own home, insulate it well and install solar water heating. For more tips, see: <www.acfonline.org.au/greenhome>
3. Ride a bike, catch public transport or car pool. Give the car and the planet a break when you can.
4. Switch your superannuation to ethical investment funds that support renewable industries rather than the fossil fuel or nuclear industries.
5. Buy local or grow your own. Industrial agriculture is one of the most fossil fuel intensive industries on earth and by buying local produce or growing your own organically you can cut down on the emissions from food production and transport.



“We have lost ten years with the Howard Government’s denial, obfuscation and bloody-mindedness; we simply cannot afford to lose another ten years before we tackle the most severe threat to our future.”

Dr. Clive Hamilton, Executive Director, Australia Institute.

“Be in no doubt: renewable energy works. Renewables now account for a quarter of the installed capacity of California, half of Norway’s and three-quarters of Iceland’s. It is time we joined the clean energy revolution sweeping the progressive parts of the world.”

- Professor Ian Lowe AO, ACF President

For ideas on how to make a difference or further information on the cause, impacts and solutions to climate change, check out these websites:

Australian Conservation Foundation
<http://www.acfonline.org.au>

Friends of the Earth Australia
<http://www.foe.org.au>

Beyond Nuclear Initiative
<http://www.foe.org.au/bni.htm>

Climate Action Network Australia
<http://www.cana.net.au>

Business Council for Sustainable Energy
<http://www.bcse.org.au>

Clean Energy Future Group
<http://wwf.org.au/ourwork/climatechange/cleanenergyfuture>

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