

Renewable energy can replace coal!

Recent months have seen a new push from the coal and nuclear industries to discredit renewable energy. You will often hear people, from the Prime Minister down, claim that renewable energy cannot provide 'baseload' power and therefore cannot replace coal-fired power stations. Greenpeace energy campaigner Mark Wakeham tackles the renewables sceptics (who not so long ago were climate sceptics) and answers some common questions.

1. What is 'baseload power'?

Baseload power simply refers to a strong and steady source of electricity which can be used as the 'base' or foundation of our energy supply. On top of baseload, we then add 'peaking power' to meet the increased demand at peak times such as late afternoon and early evening.

Historically in most parts of Australia, baseload has been provided by coal, as the cheapest source of energy if environmental impacts are ignored. However, this is not the case everywhere and there is no reason why it should be the case in Australia. There are many examples around the world, including in Australia, where renewable energy already provides baseload power (see point 4 below).

2. Can renewable energy replace coal?

The short answer is yes. There are many sources of renewable energy which can already provide strong and steady electricity to supply our baseload needs as well as our peak demand.

In order to make this happen, we must start scaling up our installation of renewable energy, develop a broad range of renewable energy technologies, and combine investment in renewable energy with strong programs to save energy. By doing these three things on a large-scale, within a few years we could start turning off the most polluting coal-fired power stations and replacing them either with megawatts of power produced by renewable energy, or 'nega-watts' of power saved by cutting energy waste.

3. How much energy could be saved through energy savings programs?

Strong energy efficiency programs can shave the demand for baseload power significantly. In the USA, California has kept its per capita demand for energy steady for over 30 years, and in Vermont, per capita energy use has gone down even with major economic growth over that time.

Australian governments have estimated that 30% of electricity demand could be eliminated with no impact on the energy services delivered (eg light, heat, power for computers, industry and air conditioning) and with significant financial, jobs and greenhouse benefits¹- and that's a government estimate signed on to by all state governments and the Federal Government! So we could significantly reduce baseload demand and start decommissioning the dirtiest coal-fired power stations in a matter of 4 or 5 years.

4. Aren't there limits to how much renewable energy you can have on the grid?

¹ COAG Ministerial Council on Energy "Towards a National Framework for Energy Efficiency- issues and challenges", Discussion paper released by Ministerial Council on Energy p.3, <http://www.nfee.gov.au/public/download.jsp?id=183>

Unfortunately we are nowhere near the point where renewable energy is creating management issues for the grid as only 8% of our electricity comes from renewable energy² and most of that is old hydro power that was built years ago. As a result, we could massively increase the amount of renewable energy on the grid, and close coal-fired power stations, without encountering any major difficulties in terms of grid stability.

Having said that, in some parts of the world we are now starting to see renewable energy contribute very high proportions of electricity generated, and with some careful planning of the electricity network, the problems that some feared might come to pass are being avoided. In Australia on a micro level the communities of Denham and King Island are generating 50 to 60% of their electricity from wind power alone, while South Australia sources 11% of its power from wind turbines and Tasmania gets 81% of its electricity from renewable energy (mainly hydro, but also significant wind power).

Internationally, Sweden sources over 50% of its electricity from renewable energy (mostly hydro and bioenergy), and has a target to increase this to 60% by 2010, while major energy economies like California plan to fast track renewables to provide 20% of electricity by 2010 and 33% by 2020. In parts of Germany and Denmark wind power is providing over 100% of the region's power needs for months of the year, as well as exporting electricity to other parts of Europe.

5. But can we really rely on renewable energy? Aren't renewable energy technologies intermittent, only providing power some of the time? What happens when the sun stops shining or the wind stops blowing?

Renewable energy sources are many and varied. Some, like solar thermal, geothermal, wave, tidal, and bioenergy are no more intermittent than coal, gas or nuclear power. Others, like wind power and rooftop solar panels, are intermittent at a local level, but when they are spread over a sufficiently large area, where different climatic conditions prevail, they are barely more intermittent than coal.

Some renewable energy technologies such as hydro power and bioenergy (burning crop waste) are also highly predictable and controllable. They can be deployed when it is most useful, providing either baseload or peak power, and they clearly demonstrate that the argument often pushed by the nuclear and coal industries, that renewables cannot deliver baseload power, is flawed. While Australia has seen its last large-scale hydro power stations, there is still plenty of scope for smaller projects like the Bogong 140 MW hydro power station commencing construction in Victoria.

Emerging renewable energy technologies like geothermal and solar thermal will be providing large quantities of baseload power in Australia long before either a single nuclear reactor could be built or a commercially feasible carbon capture and storage coal-fired power station could be developed. A solar thermal power plant at Liddell power station in New South Wales is already substituting for coal-fired power. Tidal power is in earlier stages of development but some exciting pilot projects are under way in Port Kembla, NSW, and Fremantle, WA.

Wind and solar power are subject to the weather. However, forecasting for both wind and solar power is very reliable. In most cases any lack of sun or wind can be predicted and compensated for (for instance by cranking up hydro and biomass generation). In Germany

² REGA June 2006, "Renewable Energy - a Contribution to Australia's Environmental and Economic Sustainability" <http://www.rega.com.au/Documents/Publications/J1281%20Final%20Report%20V3%20Exec%20Summary.pdf>

wind forecasters can tell 48 hours in advance how much electricity will be generated from the country's 18,000 MW of installed wind capacity with just a 5% margin of error. This contrasts for instance with coal-fired generation where outages and breakdowns are unpredictable and much more likely to plunge the electricity grid into crisis.

By deploying wind and solar en masse across the landscape we can also reduce any intermittency of wind and solar generators as it is unlikely that there will be no sun or wind anywhere across the electricity network. In addition, there are a number of exciting new developments in energy storage technologies which will help to smooth any issues – when wind and sun are providing more energy than we need, it can be stored for use later when demand is higher than supply.

Solar power can be particularly useful for delivering power at times of peak demand. Hot sunny days when air-conditioners are turned on will generally be days when there is a good solar resource. Rooftop solar has the added advantage of producing electricity where it is used, thereby minimising transmission losses. It is a little known fact that about 11% of the electricity produced at a big coal-fired power station is lost while being transported to the end user.³

Solar water heating is hugely underutilised in sunburnt Australia with less than 5% of houses having an installed solar water heater. By contrast countries like Israel, Spain and Ireland are mandating solar water heating, while China has over 60% of the world's installed solar water heating capacity.

6. If this is all true, why are so many people saying that renewable energy can only deliver at the margins?

Renewable energy is big business. The solar and wind industries are amongst the fastest-growing businesses in the world. Renewable energy is threatening the market share of the coal and nuclear industries globally. An estimated US \$38 billion was invested in renewable energy plant in 2005 alone - up from \$30 billion the previous year⁴. It's because renewable energy can and is replacing fossil fuels that the fossil fuel based industries are fighting back to protect their market share. Their primary line of attack is to belittle renewable energy technologies and attempt to prevent progressive policy which fast-tracks renewable energy. By casting doubts in the public's mind about whether renewable energy can deliver, the coal industry buys further delays in climate change action, while the nuclear industry attempts to recast itself as a climate change solution. In Australia the coal industry and the nuclear lobby have been very effective in controlling Federal energy policy, although some states are starting to support renewables. While Prime Minister Howard clearly continues to toe the coal industry line, he's even being left behind by President Bush who recently declared that wind power alone could meet 20% of the US's massive energy needs.⁵

Renewable energy and energy savings programs can replace coal-fired generation in Australia. What's lacking is not the technology – it's the political will to make it happen.

³ eg. See <http://www.csiro.au/csiro/content/standard/ps1fv,,.html>

⁴ REN21, "Renewables global status report: 2006 update", <http://www.ren21.net>

⁵ http://www.awea.org/newsroom/releases/US_Wind_Energy_Installations_Milestone_081006.html