

Energy in a Changing Climate

Coal is too cheap

That was a quote from a keynote address given a few weeks ago at the Melbourne Festival of Ideas by author Kate Grenville titled [On Artists, Writers and Climate Change](#). The quote was from a retired professor of physics who clearly saw the demise of cheap coal as desirable for addressing climate change. He obviously wasn't an anthropologist or engineer.

Two centuries ago there were those who fought against mechanisation. Their main concern was jobs (nothings changed much) but some of the protestors might have argued that steam engines driven by dirty coal were polluting the environment. If only they had understood global warming theory in those early day they might have been able to stop mechanisation in its tracks and we could still be living in peace and harmony tending our farms, not fretting about climate change and enjoying our life expectancy of 25 years.

Cheap coal has allowed us to build our modern society. Our wealth, health, standard of living, education and longevity we owe to coal through mechanisation and abundant, round-the-clock electricity. These are now essential components of our modern society and energy security is high on any government's agenda. Some may rue the day the steam engine was invented but not many of us.

But could we replace coal and keep our modern society?

Coal has not been easy to replace over the centuries and it may still be with us for many decades to come. Despite what the conservationists think, this has not been because of political inactivity or an aggressive coal lobby but lack of technology and suitable alternative energy sources.

Over a century ago, oil replaced coal for road transport. In theory it could replace coal for electricity. All you need is a machine to drive a generator so any suitable fuel will do as long as it is available when you need it. And there's the rub. With some claiming peak oil has already passed we need the rest of the oil for transport and industry.

Gas could replace coal but not everywhere. It probably could in Australia where we have abundant gas supplies (although less than coal) but gas certainly isn't as cheap as coal so we will pay a price. Many countries would have to import the gas while they sit on coal reserves and this may be inconsistent with their government's need for energy security.

Nuclear power can certainly replace coal for electricity anywhere and with significantly lower greenhouse gas emissions. It already does in many countries, but not in Australia. Now that is due to political inactivity and is neither a technology problem nor a local resource availability issue.

What about renewable energy?

As I said before, all you need is a suitable fuel (or energy resource) to make electricity. With round-the-clock electricity, the trick is having the fuel when you need it. Ample theoretical resources are not enough – the actual supply needs to be nearly constant and above all reliable. If the energy resource is the wind, the sun, moving water, heat from the ground or even wood waste, this is a problem to differing degrees. Wind and sun are the worst with highly variable supply. Wood waste supply can be constant but depends on the availability of land to grow enough wood.

Some countries are blessed with ample supplies of constantly available and reliable moving water or supplies of underground heat but not many. Even Australia struggles with hydropower from time to time.

Technologies are being developed like man-made geothermal systems and solar thermal electricity with adequate heat storage that could maintain a constant and reliable supply of electricity but it may take some time before they are ready to replace significant quantities of coal.

The beauty of coal, gas and uranium is that the fuel can be readily stored in its usable form for when we need it, unlike the wind or sunlight. If we could store the electricity produced from the wind and the sun (when it's available) for later use then the variable supply would be less of a problem. The difficulty is that electricity can only be stored as another form of energy (such as chemical or kinetic energy) and this is expensive. We seem a long way from achieving adequate quantities of cost effective electricity storage.

The idea of renewable energy powering our electricity networks alone anytime soon is a fantasy for the vast majority of the world. Most people in western society don't want to return to a 19th century life style when electricity was expensive and not always available while they wait for the right technologies to be developed. Getting rid of reliable electricity would probably fix that mechanisation problem that the luddites fought so hard against all those years ago. I doubt it will save many jobs though.

If a country doesn't have adequate gas or is not prepared to use nuclear power then coal is the only realistic option for electricity generation until technology catches up. So thank God coal is cheap – and still abundant.

Written by Martin Nicholson and first published in On-line Opinion 10 August 2009