

Energy, Is it too cheap?

Twenty years ago, or even ten year ago no one in their 'right mind' would have ever proposed that energy prices were 'too cheap' The plentiful supply of cheap energy, especially electricity, was a laudable goal.

State owned electricity utilities had largely completed the goal of 'electrifying' their respective communities and a whole generation had grown up with the expectation of being able to 'flick a switch' and change their life. Whether it was light, entertainment via a television, heating, cooling or cooking the ubiquitous switch came to our rescue like a magic genie. The provision of electricity was seen as an essential service and subsidies were available for those who could not afford.

Australia's vast coal reserves were used to power an electricity industry that underpinned our economic development. Our electricity prices were, and still are, extremely competitive by any world standard.

As engineers we had been taught that a clean fuel was a fuel that only produced CO₂ and water. Gas was a clean fuel. Coal and oil were dirty fuels because they produced NO_x and SO_x emissions. Our job as engineers was to remove these emissions along with unwanted particulate so that electricity could be extolled as a 'clean' fuel. Some of us may remember the all electric – "Gold Medallion Homes" and the "Clean Electricity" advertising programs. The geologist's job was to keep finding more fossil fuel deposits. Provided we had ample reserves then the world was functioning as it should.

Nuclear fuel, claimed by many to be an ideal alternative to fossil fuels has always been contentious. In the light of 'Chernobyl' and 'Three Mile Island' the already divided public opinion moved away from nuclear fuel. Moreover, simple economics also moved against nuclear fuel. For most of us, especially in Australia, nuclear energy was never an option and I am not sure that we have ever really had the 'nuclear debate'. Perhaps we are now beginning to have a debate about whether or not we should have a debate.

But then, about 15 years ago something began to happen. In the distance faint voices were heard to whisper about the 'greenhouse effect'. Slowly, the faint whispers became loud and clear. Where once, newspapers printed articles about 'a possible' greenhouse effect and theoretical global warming, we are now seeing articles about the effects of climate change and predictions of what the 'new climate' will be like.

As the pace of discussion about the 'greenhouse effect' increased, so did the pace of discussion about energy conservation. Energy had to be conserved because creating energy meant burning fossil fuel, and burning fossil fuels meant making CO₂. The laws of chemistry were immutable, carbon plus oxygen produced carbon dioxide. But, therein lie the two fundamental dichotomies.

Firstly, energy conservation will, not in itself, eliminate the greenhouse effect. That's not to say that energy conservation will not go a long way to reducing the greenhouse effect. With a concerted effort we might be able to reduce our per capita energy use by 25%. Given our current mix of generating plant and preference for coal, the reduced energy use would probably displace a disproportionate amount of gas generation. The net effect might be a 20% reduction in CO₂ emission, which is certainly a step in the right direction. Changes in our mix of generating plant and better use of public transport might make another 10% savings. This would certainly

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'take the heat' off and buy valuable time. However, despite all our efforts at energy efficiency, citizens of the world's developing countries are also demanding their share of the world's resources. Thus, barring any major catastrophe, global energy use is destined to rise.

Secondly, there is a growing body of thought that current 'price signals' built into the cost of energy do not accurately reflect the price of carbon. One MWh of electricity (energy only) can probably be bought for about \$30. This probably values CO₂ at about \$30/tonne. On simple economic terms, these prices do not give the right signals to really push energy conservation. Nor do they give the right signals to change the mix of generators and start pushing through Combined Cycle Gas Turbines (where the large savings will be made). For a real impact we would probably have to double these prices. So, do we increase electricity prices?

The problem with increasing electricity prices is that it is most likely to hurt those that can least afford it. On a personal level, most of the 'middle class' would learn to live with higher energy prices, pay higher bills and probably not change their habits. Industry, especially industry intensive industries that have to compete on an international level would also be hurt. However, the net 'energy conservation effect' taking into consideration the resulting economic slow down, may not be all that significant. Electricity is often claimed to be one of the most price inelastic commodities.

Raising energy prices may not be a panacea to the greenhouse effect. Current government policy that results in the imposition of various levies that are in turn used to fund energy efficiency or renewable electricity, may be the best approach. Hopefully these initiatives will begin to deliver some real energy efficiency improvements and continue to stimulate the 'renewable' electricity sector.¹

This would give us time to make the really hard decisions. These are the decisions that affect the 'supply side' of the equation. If we accept that there is a greenhouse effect then we have to take a very hard look at our use of fossil fuels, and especially coal for our base load power stations. Money needs to be spent on new technologies to dramatically improve efficiency. For example some of the new coal gasification technologies or carbon sequestration technologies. Alternatively, Combined Cycle Gas Turbines will have to pick up more of the base load. We also need to look further a field at some of the emerging renewable technologies - technologies that could make distributed photovoltaic a reality. Yes, there is a problem with energy storage that will perhaps lead us to a hydrogen economy. But, the technology is not that far off and these will be the technologies that can really begin to mitigate the greenhouse effect.

Nuclear Energy is still the 'wild card'. To some, it is the potential saviour; to others it presents an even greater risk that global warming. Let's hope we can start implementing some sensible supply side options before we have to open the nuclear genie.

¹ As an aside, I suspect replacing the current 'patchwork' of state based programs with a set of national initiatives would add further gain.