

When I saw your notice in the Sydney Morning Herald calling for comments on the implications of the Kyoto Protocol for Australia, I knew I had to submit my comments. If I didn't I would, in a way, be condoning the unabated use of fossil fuels and their associated detrimental effects on the environment. Although I know that global warming is real and a threat to our well-being and that abating any further warming is within our grasp, I also know I am unable to cite any references to the evidence. To overcome this obvious stumbling-block, I have relied heavily on Greenpeace's submission and references cited within which is freely available on the web¹. Greenpeace has the time and resources to argue these issues in a well-founded, informative manner. I have a few comments of my own but most of my facts and figures are in the Greenpeace submission - I have argued in my own way using their research.

The Kyoto protocol arose from an urgent need to reduce the amounts of greenhouse gases, most effectively achieved by phasing out the use of fossil fuels such as oil, coal and gas. There is no longer any question as to the detrimental effects that burning fossil fuels has on the environment. In 1990, the United Nations Advisory Group of Greenhouse Gases (UNAGGG) identified what limits to climate change were tolerable warning that: "Temperature increases beyond 1°C may elicit rapid, unpredictable and non-linear responses that could lead to extensive ecosystem damage."² Coral reefs are an example of a fragile environment - a 1°C increase in temperature above the summer maximum can cause coral 'bleaching', killing large sections of coral reef.³ The burning of fossil fuels and the resultant emission of CO₂, has been singled out as being the biggest contributor to temperature increases. According to the Intergovernmental Panel on Climate Change (IPCC), a doubling of CO₂ in the atmosphere could cause temperature increases between 1.5 and 4.5°C.⁴ In a recent CSIRO report, 75% of Australia's greenhouse gas emission came from fossil fuel sources.⁵

The urgency for alternative, renewable sources of energy has not been ignored. One could not fail to notice the highly commendable efforts by the big oil companies BP, Amoco, ARCO and Castrol forming the company 'BP' - beyond petroleum.⁶ The oil companies, who actually extract and sell fossil fuels, have seen the 'writing on the wall'. Consequently, they strive to produce petrol and diesel with lower emissions and are the world's leading producers of solar power. This leaves little doubt of the importance of curbing our dependence on such unsustainable forms of energy.

It could be argued that Australia has already taken the initiative with the National Greenhouse Strategy (NGS). However, the very voluntary nature of this program has meant that hardly anyone has taken it up - only 209 out of 890,000 businesses in Australia have joined the NGS's Greenhouse Challenge Program, a program designed to improve the energy efficiency in business and industry.⁷ The NGS has even embraced the challenge of reducing emissions from the domestic-energy or transport sectors. In 1997, the Prime Minister of Australia announced an 'initiative' to increase the amount of

¹ <http://www.greenpeace.org.au>

² Rijsberman F.J and Swart R.J (eds) 1990 Targets and Indicators of Climate Change; Stockholm Environment Institute for the UNAGGG

³ Basher R et al 1997 Regional Impact of Climate Change: IPCC Special Report

⁴ Intergovernmental Panel on Climate Change; Second Assessment Report; 1995

⁵ Mitchell C CSIRO Division of Atmospheric Research; Climate Change Newsletter, Vol. 11, No. 3, Oct 1999

⁶ <http://www.bp.com>

⁷ Greenhouse Challenge figures from the AGO and total business figures from the Australian Chamber of Commerce

electricity generated from renewable sources by 2% by the year 2010. The initiative has yet to be implemented with renewable energy as a total share of electricity generated falling back by 0.6% two years later. In this same two year period, Denmark increased its share of renewables by 3%.⁸ If anything, the State and Federal Governments have supported continued use of fossil fuels by pushing ahead with Queensland's Stuart Shale Oil project and approvals of new conventional coal-fired power stations (see a zero-emission coal powered alternative on page 3). The oil shale development alone will receive up to \$240 million in Federal and State Government subsidies and increase Australia's overall greenhouse emissions by 2.3%. The new GST package introduced in July, further increased subsidies to fossil fuels by \$1.6 billion.

The cheap electricity prices offered to industry by fossil fuel power stations has left little incentive for renewable energy alternatives. With guaranteed parity pricing for electricity generated from renewable energy technology and feed laws (requiring electricity retailers to provide easy and affordable connection to the electric grid for people and businesses offering renewable forms of energy), then renewable energy technology will be more likely to be taken on board.⁹

The ratification of the Kyoto protocol can only be of benefit to Australia. It will provide Australia with a unique opportunity to share with the other parties to the protocol the latest advances in renewable technologies and develop these technologies for the future. Australia already has expertise in many of the alternative energy technologies and being party to the Kyoto protocol makes economic sense both in setting up new industries and in abating any further changes to the world climate. The energy technology based industries create more jobs per A\$ million (eg: solar electric 3.5 jobs¹⁰) than fossil fuel based industries (eg: 0.5 job for the oil shale project¹¹). Denmark leads the world in wind energy and Australia could well lead the world in solar energy. Pacific Solar estimates that with an investment of \$580 million, Australia could be at the forefront of solar panel manufacturing - the industry would be worth more than \$1 billion annually and create 3500 direct jobs by 2010¹². According to a BP Solar study¹³, the establishment of a \$800 million solar panel factory would reduce the cost of solar panels to one-quarter of their current price. This would make solar energy more competitive with energy from fossil fuels. Research and development of renewable energy technologies are already being actively pursued throughout Australia¹⁴ - research of the highest standard. Australia could assert its position here rather than and be overtaken by other countries overseas.

In the years 1997 and 1998, the world had experienced extraordinary climatic disasters amounting to tragic loss of life, millions of homeless and billions of dollars in damage. The connection of these disasters with global warming is indisputable. Australia relies heavily on its agriculture, with the rural sector accounting for a large part of our export earnings. The total value of Australia's agricultural production on 1997-98 was

⁸ http://www.ens.dk/uk/energy_reform/bill_no_235.htm

⁹ Crawford, S 1999 Renewable Energy: Breaking Through the Barriers A CIPSE Report, Sydney

¹⁰ BP Solar's planned expansion in Sydney would provide 200 jobs for an outlay of \$57 million. (BP Solar Media Release 11/8/98, 'Bp to Build World Class Solar Manufacturing Plant in Sydney').

¹¹ 122 jobs for an outlay of \$250 million (<http://www.suncor.com>)

¹² Lawly, P 1998 Going for Gold: Taking the Australian PV Industry to Number One, Pacific Solar Pty

¹³ Bruton, T M (BP Solar International) et al, for the Commission of the European Union 1996; Multi-Megawatt Upscaling of Silicon and Thin Film Solar Cell and Module Manufacturing

¹⁴ see for example the renewable research programs by CSIRO, CRC and Universities throughout Australia on their world wide web sites

\$28 billion¹⁵. The IPCC concluded that Australia is particularly vulnerable to climate changes because of its tropical/subtropical latitude, its scarce water sources and the fact that crops already grow at or above their optimum temperature¹⁶. Severe droughts and floods have already caused costly damages. Warmer environments will cause the spread of pests and disease^{17,18}. Action now towards reducing greenhouse gases at perhaps some small (in retrospect) initial cost will forego future disasters of incalculable cost.

I must mention just one example of a timely innovation, an innovation worth taking on in the interim whilst renewable energy sources are being developed to ultimately fulfil our energy needs. Scientists, at Los Alamos National Laboratory, are developing a zero emission process for converting coal and water slurry into hydrogen, which in turn is converted to electricity via a high-temperature solid-oxide fuel cell¹⁹. Hydrogen gas is produced from water and coal using a calcium oxide (CaO) to calcium carbonate (CaCO₃) reaction. The calcium carbonate is then converted back into calcium oxide and a pressurised stream of pure CO₂. The calcium oxide is recycled to drive further hydrogen production and the CO₂ stream is ready for disposal. The solid-oxide fuel cells generate electricity with an efficiency of about 50%. The other 50% of 'waste' heat produced is reinjected into the process to drive the reaction. The process requires no oxygen input or combustion. The process can be adapted to run on any fossil fuel, or even biomass. In comparison to a conventional power plant, this system generates at least twice as much electrical energy per unit of fuel consumed and produces less than half the CO₂ waste per kilowatt hour generated. The CO₂, however, can be sequestered via mineral carbonation - the pressurised CO₂ stream is reacted with magnesium or calcium silicate mineral deposits to form geological stable mineral carbonates. This reaction is part of the natural geological carbon cycle; the mineral end products naturally occurring and benign. Mineral carbonation offers permanent fixation of CO₂, thereby removing legacy issues for future generations.

Ratification of the Kyoto protocol ensures that future limits on emission of greenhouse gases can be established in a cooperative spirit by the nations of the world. Being party to the protocol would be a clear message to those countries not parties to the protocol (such as the USA) that Australia is responsive to the need for immediate action as regards global warming. Our inclusion may influence other nations to be as responsive and show us to be a leader in the movement.

The proposal to plant trees as a means of meeting the Kyoto target, can never, by itself, be a viable solution to limiting greenhouse emission.²⁰ Carbon emissions must be tackled at their source. At the 5th Conference of the Parties (CoP5) meeting in Bonn, the IPCC reported that carbon sinks will be a short term "time buying" exercise at best.²¹ Trees do act as a CO₂ sink, but planting trees would have little impact on the vast amounts of CO₂ in the atmosphere. Plants are important, however, in controlling the groundwater levels and hence the salinity of the soil, as windbreaks, securing the topsoil and have the potential to provide a sustainable supply of methanol and other hydrocarbons. Global

¹⁵ Australian Bureau of Statistics

¹⁶ Basher R et al 1997 op cit

¹⁷ CRC for Tropical Pest Management, CSIRO Division of Entomology, 1996

¹⁸ Ward, M P, 1994, The Use of Discriminate Analysis in Predicting the Distribution of bluetongue virus in Queensland, Veterinary Research Communications 18:63-72

¹⁹ <http://www.lanl.gov/energy/ziock/ziock.html>

²⁰ <http://www.csiro.au>

²¹ Nobel, I "Carbon Dating" in Sydney Morning Herald, Thursday 28 October 1999

warming has been with us for 30 years. For the past 20 years, its causes and effects have been known but, sadly, nothing has been done. The challenge is be daring enough to break the mould and do something. Ratifying the Kyoto protocol is the most effective way that Australia can take the first step in curbing global warming. The quality of life of our children tomorrow will depend on the decisions we make today. It is time we made decisions for the long-term and not for some short-term political gain.

Jeanette Weise,
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