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Backing a Loser

Dr Mark Diesendorf

The Australian coal industry has all the characteristics of long-term loser. Employment peaked in the mid-1980s at around 37,000 and since then has fallen to 19,000 in 2002, as a result of technology change and low world coal prices. Employment in the Australian electricity industry, which is overwhelmingly based on coal-fired power stations, declined by 50% over the period 1991 to 1999, mainly as a result of industry restructuring.

Despite the opposition of the US and Australian governments, the Kyoto Protocol, which commences the international process of reducing greenhouse gas emissions, is likely to come into force later this year. If Australia continues to refuse to ratify, many Australian businesses are likely to miss out on the emerging opportunities for Joint Implementation and the Clean Development Mechanism. And increasingly, we are likely to see overseas countries applying taxes on the import of Australian coal.

Unfortunately the government does not seem to be planning for the possibility of a long-term energy future in which cleaner technologies – efficient energy use, renewable sources of energy and natural gas -- play an increasingly important role. Rather, it has terminated funding for the only Cooperative Research Centre for Renewable Energy, while maintaining funding for the *three* Cooperative Research Centres devoted to fossil fuels.

This situation suggests that the government has already decided to continue to prop up the old smokestack energy industries and to starve the new, clean, innovative energy industries. Ministerial statements indicate that the government sees a new Magic Bullet solution for preserving the coal industry at all costs, *geosequestration*.

Geosequestration involves the capture of the carbon dioxide (CO₂) gas emitted by large point sources such as coal-fired power stations, compressing it, transporting it through pipelines, and then storing it in underground geological formations, such as depleted oil and gas wells, saline aquifers, and deep unminable coal seams.

A public champion of geosequestration has recently emerged in the form of the Prime Minister's Science, Engineering and Innovation Council (PMSEIC). The Executive Officer of PMSEIC, Dr Robin Batterham, is also Chief Technologist of the Rio Tinto Corporation, one of Australia's largest coal producers, and is the Prime Minister's Science Adviser.

A report produced by PMSEIC claims extraordinarily low costs for geosequestration, between \$10 and \$50 Australian per tonne of CO₂ sequestered underground. PMSEIC attempts to

substantiate them by citing an unpublished report by 'Roan Consulting' and a report by the International Energy Agency's Greenhouse R & D Programme.

Pursuing the trail a little further, I found that 'Roan' does not seem to exist, however I'm aware of a consultancy called Global Roam with expertise in the electricity industry. The IEA report and subsequent paper are well known in the field and respected as a starting point for serious cost estimates. However, the actual IEA cost estimates start at around US\$45-US\$50 per tonne of CO₂, that is A\$75-A\$83 per tonne, assuming a rate of conversion of A\$1 = US\$0.60. It seems that PMSEIC and its Executive Officer have some explaining to do.

The outcome is that the total costs of partially cleaned up coal electricity in Australian currency become 10-11 Australian cents per kilowatt-hour (kWh) of electricity generated. The IEA authors emphasize that these results are for *new* power stations and that the cost of cleaning up CO₂ waste from existing power stations would be higher. It would take at least until 2008-2010 before we see the first of these new coal-fired power stations with geosequestration.

The IEA cost estimates for geosequestration may be compared with current international prices for wind power of US 4-5 c/kWh (A 7-8 c/kWh) in North America and Europe, which are expected to decline to US 3-4 c/kWh by 2010. Denmark, the leader in the renaissance of wind power, has already created 16,000 new jobs in that industry, which has been expanding globally at 25% per year over the past decade. Some technologies for burning crops and crop residues, waste and landfill gas are even cheaper and offer the prospect of even more local jobs.

Geosequestration of CO₂ from coal-fired power stations is unlikely to be competitive with the cheaper of the renewable sources of electricity in 2010 and beyond, unless it receives either a large economic benefit from enhanced oil or gas recovery or large economic subsidies. The latter possibility is a genuine ground for concern, because in Australia financial subsidies and incentives to the production and use of fossil fuels already amount to billions of dollars per year.

Another constraint on geosequestration is the limited storage capacity in Australia. The GEODISC group of the Cooperative Research Centre for Greenhouse Gas Technologies has found that the largest storage potential is in Western Australia, while the biggest point source emitters are in eastern Australia. There is no suitable store near the huge CO₂ emission hot spot spanning the Hunter Valley-Lithgow-Port Kembla region. The study concludes that Australia has the potential to store about 20% of Australia's total annual CO₂-equivalent emissions near large emitting sites.

The main danger of underground storage is the risk of escapes of large volumes of CO₂, leading to both global climatic and local environmental and health impacts. Since CO₂ is heavier than air, the sudden arrival of a large volume of CO₂ at a point on the Earth's surface could result in low-lying areas near the breach filling with CO₂ and people becoming asphyxiated. This kind of event could occur as a result of lack of knowledge of the store, mistakes in operations, earth tremors, or sabotage.

Australian decision-makers need to grasp the large number of uncertainties associated with these coal-based technologies before rushing headlong into making them the principal greenhouse gas

reduction strategy. It would be a mistake for governments to back a loser, coal-fired power, and to slow the development of efficient energy use and renewable sources of energy, in the hope that in a few years the largest source of greenhouse gas pollution can be made completely benign.

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