# Reducing Emissions from Coal in Australia: Fiscal and Related Instruments – the Current State of Play

**Gisele Kapterian, Peter Gillies,* Patricia Blazey****

Coal combustion contributes significantly to anthropogenic greenhouse gas emissions. This paper examines the role of coal in power generation in Australia, the growth rate in demand for power, and the contribution of coal in the future to the energy mix, in two situations: (1) with, and (2) without changes to taxation and associated policies. The present tax status of coal producers and power generators and consumers is evaluated. Following this the potential impact upon emission levels of such instruments as a carbon tax and an emissions trading scheme (neither of which are presently applied in Australia) is discussed.

## 1 Introduction

Australia has consistently pioneered some of the world's most cutting-edge renewable energy technologies, including solar power advances and hydrogen research. Yet, federal government policy remains committed to the use of coal as Australia's primary energy resource.

This paper examines the role of coal in power generation in Australia, the growth rate in demand for power and the contribution of coal in the future to the energy mix, in two situations: (1) with and (2) without changes to taxation and associated policies. The present tax status of coal producers and power generators and consumers will be evaluated, following which the potential impact upon emission levels of such instruments as a carbon tax and an emissions trading scheme (neither of which are presently applied in Australia) will be reviewed. Current proposals from the energy industry and others in Australia are for the reduction of carbon dioxide emissions of between 50% between 2000 and 2030 and 70% between 2010 and 2050.

## 2 Coal in Context

Coal is of critical importance to the Australian economy. Australia is currently the world's fourth largest producer and the world's largest coal exporter, supplying 28.9% of the total global coal export market and contributing approximately A$24.5 billion to the economy in 2005-2006.[1] Domestic energy is also highly dependent upon coal, with over 85 per cent of electricity sourced from coal-fired base-load power stations.[2] Its

*Professor of Law, Macquarie University ** Head of Department of Business Law, Macquarie University

[1] Australian Coal Association, *Industry Overview*, available at http://www.australiancoal.com.au/overview.htm accessed 2 August 2007.

[2] Janine Mace, 'Renewable Energy', Association of Chartered Certified Accountants, 13 July 2007, http://www.accaglobal.com/members/publications/accounting_business/archive/2007/julyaugust/2980610 accessed 7 August 2007.

abundance, accessibility and low cost has secured its place as the primary energy source for the nation's industries and has aided in ensuring their international competitiveness and success.[3] In fact, Australia' electricity prices have ranked amongst the lowest of all OECD countries for both residential and industrial use.[4]

The historical importance of the coal mining industry in supporting much of the social and economic development of many areas in Australia, has not waned. The industry directly employed a twenty year record high of over 30,000 people and produced over 399 million tonnes at the end of 2005 (representing an increase of over 5.6% on the previous year).[5] World demand for coal has increased, with continued demand growth for both thermal and metallurgical coal and forecasts predicting a further increase over the next several years.[6] In response, private exploration expenditure for coal in 2005-2006 totaled $A166.4 million, representing an increase in over 31% over the previous year and over three times the amount spent in 2001-2002.[7]

Australia's abundance of reliable and cheaply accessible coal situated close to energy load centres has been seen as a mixed blessing in recent years as the world's stance on fossil fuel powered energy has become increasingly negative. Coal combustion, being the major source of base-load electricity, contributes 92 per cent of electricity emissions.[8] Electricity generation emissions make up more than two-thirds of the stationary energy production, which itself is the largest source of emissions in Australia.[9] This has been complicated by the fact that final consumption of electricity in Australia is expected to increase from current levels of around 216 TWh to 386 TWh in 2029-30.[10] Accordingly, energy sector greenhouse gas emissions have been predicted to grow by more than 30 per cent by 2020.[11] Further, not only does the electricity industry itself rank as one of Australia's largest industries, contributing 1.5 per cent of Australia's gross GDP

---

[3] Australian Coal Association, *Industry Overview*, available at http://www.australiancoal.com.au/overview.htm accessed 2 August 2007.

[4] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 26, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007

[5] Australian Coal Association, *Industry Overview*, available at http://www.australiancoal.com.au/overview.htm accessed 2 August 2007.

[6] *Energy in Australia 2006*, ABARE, 13, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf

[7] *Energy in Australia 2006*, ABARE, 13, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf ; Australian Coal Association, *Industry Overview*, available at http://www.australiancoal.com.au/overview.htm accessed 2 August 2007

[8] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 41, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007.

[9] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 28, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007

[10] *Energy in Australia 2006*, ABARE, 41, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf

[11] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 40, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007

directly,[12] the energy sector provides a significant secondary taxation source for the Federal and State governments.[13]

Thus, problem being faced is how to reduce emissions levels without losing the competitive advantage provided by Australia' natural resources. The problem is particularly relevant to Australia as it is one of only a few OECD countries that has a significant reliance on primary and resource processing industries which are substantially dependent upon these natural resources either directly or indirectly.[14] The impact of these industries in creating the high living standards currently enjoyed by Australians has further secured the importance of their continued operation at current cost levels.

Recognising the character and make-up of Australia's current economic structure, the federal government's response to emission abatement pressures has been to implement policies that show a commitment to coal remaining the most commonly used fuel in electricity generation. The government has consistently argued that it would only pursue policies that have the least negative impact on competitiveness, investment, regional development and jobs.[15] The delivery of competitively priced and secure energy sources have been the cornerstone of the government's energy policy, consistently stating that any action in the energy sector must 'simultaneously deliver prosperity, security and sustainability'.[16] These issues have been declared the reason behind the Federal government's refusal to ratify the Kyoto Protocol and instead join the United States, China, India, Japan and South Korea to form the Asia-Pacific Partnership On Clean Development and Climate. This orgnanisation shifts the focus from the setting of emissions targets to the development and deployment of clean technology.[17]

In this context, it is clear that the emissions reduction will necessarily have a wide-reaching effect on the Australian economy, although the extent of that impact will be entirely dependent upon the particular character of the policies eventually decided upon. That is not to say that Australia's current economic structure cannot adapt to the new

---

[12] *Energy in Australia 2006*, ABARE, 41, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf accessed 6 August 2007.

[13] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 42, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007 **come back to get precise figures.**

[14] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 26, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[15] The Hon Dr David Kemp, MP , 'Sustainable Energy', National Conference of the Australian Business Council for Sustainable Energy, Brisbane, 9 April, 2003, available at http://www.environment.gov.au/minister/env/2003/sp09apr203.html 8 August 2007.

[16] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 43, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007.

[16] *Energy in Australia 2006*, ABARE, 41, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf accessed 6 August 2007.

[17] John Howard, PM, Ian MacFarlane and Ian Campbell, *Australia joins New Asia-Pacific Partnership on Clean Development and Climate* (Joint Press Release, 28 July 2005 available at http://www.environment.gov.au/minister/env/2005/mr28jul205.html accessed 10 August 2007.

low-emission environment; rather, successful adaptation will a slow process that requires careful consideration of competing interests and objectives. The 2007 Prime Ministerial Task Group on Emissions Trading has emphasized that the key to a smooth transition to an emissions constrained economy is "maximum reliance on market mechanisms to reallocate resources", thus minimising the costs of adjustment and "encourag[ing] the emergence of new sources of growth, employment and prosperity".[18] However, the reality of the situation appears to be that, regardless of the path Australia eventually chooses to achieve such reductions, the economic impact will be much greater if its operates in the absence of a global cohesive emissions abatement policy given the significance of Australia's fossil fuels export trade.[19] It is significant that the economic importance of Australian coal exports is reciprocal for many developed and developing countries around the globe. The International Energy Agency has stated that world energy use will continue to depend on fossil fuels including Australian coal for the foreseeable future.[20]

The government's various policies introduced thus far have delivered mixed results, both in terms of cost and effectiveness. These policies have been highly criticized in some industry circles, terming it the evolution of a 'patchwork of highly disparate and fragmented policy measures'.[21] The Energy Retailers Association of Australia has stated that the current arrangements do not lead to least-cost abatement and this inefficiency is ultimately borne by energy consumers and the community generally.[22] Certainly some significant progress has been made in reforming the electricity markets to meet both increase in the demand (domestically and overseas) as well as reducing environmental impacts. Over A$1.8 billion has been committed to the emissions abatement challenge since 1997. Abatement measures have taken various forms including voluntary corporate participation programs, mandatory standards for power generation, energy-use efficiency and mandatory implementation of new renewable energy in power supply.[23] However, at this point, renewable energy only accounts for less than five per cent of total energy consumption.[24]

---

[18] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 28, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[19] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 29, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[20] Cited in *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 31, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[21] Energy Retailers Association of Australia, Submission to the Prime Ministerial Task Group on Emissions Trading, 9 March 2007, 1-2, available at http://www.eraa.com.au/db_uploads/ERAATaskGroupsubmissionFINAL.pdf accessed 10 August 2007.

[22] Energy Retailers Association of Australia, Submission to the Prime Ministerial Task Group on Emissions Trading, 9 March 2007, 1-2, available at http://www.eraa.com.au/db_uploads/ERAATaskGroupsubmissionFINAL.pdf accessed 10 August 2007.

[23] Rory Sullivan, 'Greenhouse Challenge Plus: A New Departure or More of the Same?' (2006) 23 Environmental P Law Journal 60, 61

[24] *Energy in Australia 2006*, ABARE, 69, available at http://www.abareconomics.com/publications_html/energy/energy_06/Energy_booklet06.pdf accessed 6 August 2007.

## 3 Energy Demand and Emissions Projections

The IEA World Energy Outlook 2002 projects global energy use to grow by two-thirds from 2002 to 2030, with fossil fuels meeting more than 90 per cent of that increase.[25] World coal consumption , measured in millions of short tons, was 5220 in 1990, 5440 (2003), and has been estimated to total 6960 in 2010, 8640 in 2020, and 10560 in 2030, in the absence of carbon penalties. The 2030 total would represent an increase of 102% over the 1990 total. In the absence of carbon penalties, the average annual world growth in energy consumption over the period 2002-2030 has been projected to be 2%, and coal consumption at 2.5%. That is, coal will supply a steadily growing percentage of energy resources. Again, in the absence of penalties, the world annual growth in CO2 emissions from total energy use during this period is projected to average 2.1%, but that for coal is projected to be 2.5%.[26]

Energy demand in Australia is expected to push national emissions to 127% per cent of 1990 levels by 2020.[27] Australia has not ratified Kyoto, but it has set itself a comparable target for limiting emissions to 108 per cent of 1990 levels for the period 2008 to 2012 and appears to be broadly on track to meet this target. The expected 127% increase from 1990 levels in 2020 is predicted to be driven predominately by an 84% increase in stationary energy supply.[28] This increase has been attributed to the strong increase in demand for energy by the residential and commercial sectors and projected growth in energy and resources exports such as LNG and alumina.[29]

There has been much controversy in the domestic political arena over target setting and the timeframe over which emission abatement should be achieved.[30] The reason for the controversy is directly related to the high degree of uncertainty that surrounds the impact assessment of long-term cuts to global greenhouse gas emissions. Sir Nicholas Stern has recommended that Australia adopt a 60 per cent by 2050 reductions target (along with a number of other developed countries) and 30 per cent of that to be attained by 2020.[31] While the Howard Government has agreed to implement a carbon trading scheme by

---

[25] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 48, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007

[26] *The Future of Coal – Options for a Carbon Constrained World*, MIT, 2007, pp7-8.

[27] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 33, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[28] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 33 available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[29] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May, 2007, Chapter 2, 33 available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[30] See AM Transcript, 'Howard Discusses Climate Change Response', 29 March 2007, available at http://www.abc.net.au/am/content/2007/s1884348.htm accessed 15 August 2007; The 7:30 Report, Howard Plans Response to Greenhouse Challenge, 31 May 2007, available at http://www.abc.net.au/7.30/content/2007/s1939320.htm accessed15 August 2007.

[31] www.sternreview.org.uk

2012 it has refused to disclose a target for reducing emissions until 2008.[32] Moreover, the government has stated that such targets, particularly 30 per cent by 2020, would lead to economic dislocation, unemployment and the destruction of Australia's competitive position.[33] This paper will now turn to examining the current fiscal and related policies aimed at reducing CO2 emissions from coal, followed by the economic viability of fiscal measures and/or market based instruments and the cost of reducing emissions by 60% in 2050.

## 4 Current Fiscal regime

Coal taxation arrangements are a fundamental issue in calculating the viability of emission abatement policies that mitigate the potential negative impacts on Australia's economy. As the Federal Government's White Paper on Energy stated, " [t]he large scale of energy projects and consequent need for international capital arguably make the energy sector more sensitive to the international competitiveness of Australia's fiscal regime than many other sectors".[34] As electricity is currently sourced almost entirely from coal based power stations and is the main source of greenhouse gas emissions from the energy sector and for Australia as a whole, this section will focus on the fiscal treatment of electricity.

The taxation of electricity production occurs on many different levels, both at the Federal and State levels, and has traditionally varied between the different States and Territories within Australia. At the primary level, energy sector investments receive the same treatment as all other large investments in the general tax system, which, due to the Federal Governments recent reforms, means that company tax is now 30 per cent rather than 36.

### (a) Coal Mining

Diversification amongst the States/Territories fiscal policies occurs here at the secondary level of taxation and apply to all energy resources (coal, uranium, gas and liquid petroleum).

Queensland and New South Wales are the primary producers of black coal in Australia, while Victoria produces lower quality brown coal. An ad valorem royalty applies to coal mined in Queensland while NSW applies three different rates depending upon the type of mine in an attempt to incorporate the greater risks and costs of underground as opposed to open-cut mining. (Open cut mines are subject to a 7 per cent ad valorem royalty. This

[32] Environment News Service, 'Australia's Emissions Trading Scheme Sets No Cap, No Date', 17 July 2007, http://www.ens-newswire.com/ens/jul2007/2007-07-17-03.asp

[33] John Howard speaking on the 7:30 Report, 'Nicholas Stern issue Climate Change Challenge', ABC programme transcript, 28 March 2007, http://www.abc.net.au/7.30/content/2007/s1884160.htm accessed 15 August 2007.

[34] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 62, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007

rate drops to 6 per cent for underground mines and 5 per cent for mines deeper than 400 metres.)

The legal mechanism for acquiring coal from private land owners in NSW illustrates the importance it plays economically. In 1981 the Coal Acquisition Act was passed which transferred all private coal ownership to the State of NSW. It was after coal owners lobbied the government that a compensation scheme was set up. The Compensation Scheme was set up in 1985 as a result of the Coal Acquisition (Compensation) Arrangement 1985. A Board was put in place to assess claims for compensation by former coal owners. It uses formulae to assess the future income streams of coal royalties. Two periods for claims resulted. The first one closed in 1986 when over 9,000 claims were received. The second and final period ran from in December 1992 to 1994 when over 9000 new claims were registered. [35]

Victoria has imposed a royalty on brown coal since 1 January 2006 based on the energy content of the coal. This price is regularly adjusted to account for inflation. Western Australia has also imposed a royalty rate calculated by tonnage for all coal used within the domestic market while and a royalty rate on an ad valorem basis applies to exported coal. Coal production in the South Australia attracts an ad valorem rate while the two territories do not produce significant (if any) amounts of coal.

In jurisdictions like NSW and Queensland, the contribution of the coal industry to government revenue is particularly significant. In the last seven years, the NSW coal industry has produced close to A$1 billion each year for the NSW government, inclusive of royalties, payroll tax, and local government rates and other taxes.[36] All of the mining industries also generate considerable federal revenue by way of company tax and income tax.

**(b) Electricity Suppliers and Consumers**

The formal fiscal treatment of electricity generators and consumers is relatively uncomplicated. Generators/producers have remained largely unaffected by emissions policies introduced at both the Federal and State levels while consumers are simply charged a standard 10% per cent Goods and Services Tax. Suppliers pay the standard 10% Goods and Services Tax (GST) on wholesale purchases of electricity, which is then passed on to consumers, who pay the 10% GST on purchases. The supplier then gets a rebate for GST paid.

Effectively, however, consumers are paying or will soon pay a de facto carbon tax, or cost, having regard to the costs imposed upon (ultimately) consumers by schemes aimed

[35] Coal Acquisition "Act 1981, Coal Acquisitions (compensation ) Arrangements 1985; Coal Ownership (Restitution) Act 1990; Coal Acquisition 9 Re-acquisition Arrangements) Order 1997 website <www.ccb.nsw.gov.au/about/compensation_scheme> accessed 2 October 2007

[36] Dr Nikki Williams, Chief Executive, NSW Minerals Council, 'Coal Taxation in NSW: Implications for Sustainable Industry', Australian Coal Conference, 19 November 2004, 8.

at promoting renewable energy targets.[37] These schemes are examined immediately below.

## 5 Current Fiscal Emissions Constraints Relating to the use of Coal in Energy Production

Both the Federal and State governments have adopted a significant number of overlapping, though unrelated policies aimed at reducing greenhouse gas emissions. However, while these policies do display different approaches to the problem and deliver widely different results in terms of cost and effect, all demonstrate a commitment to maintaining coal as a significant contributor to the energy mix.

By way of background, Australia's electricity industry was fundamentally restructured in the early 1990s when the predominately state-owned structure was dismantled into separate generation, transmission, distribution and retail supply components. While privatization has occurred in most instances, retail price regulation is pervasive in all Australian electricity retail markets. Despite this, competition is now widespread across the country.[38] Most recently, the Queensland government completed its sale of electricity and gas, arguably allowing this sector proper scope to invest and explore clean and renewable energy sources.[39] Importantly, the national restructuring resulted in the establishment of the National Electricity Market in 1998.

Fiscal policy at this level has been, until recently, completed divorced from environmental considerations. Security of supply and competitive pricing have dominated policy direction. However, in 2003, the NSW government introduced the first emissions trading scheme in Australia in the form of the Greenhouse Abatement Scheme (NGAS) under which electricity retailers and other parties were required to meet mandatory annual targets for reducing greenhouse gas emissions from electricity production. Operating under a 'base-line and credit' scheme as opposed to a 'cap and trade', NGAS was established to provide incentives for the implementation of greenhouse gas abatement activities by imposing a penalty on retailers of $10.50 per tonne of emissions above their annual targets (equivalent to $15 per tonne after tax).[40] The penalties are indexed according to the CPI and are pre-established under the *Electricity Supply Act* 1995. If a retailer exceeds its baseline target, it may avoid paying the penalty by producing the adequate number of abatement certificates which have been bought from other eligible entities that undertake emission-reducing activities such as the development

[37] See the *Owens Inquiry into Electricity Supply in New South Wales*, released Sept 2007, at 5-18. www.premiers.nsw.gov.au/WorkandBusines/DoingBusinessinNSW/OwensInquiryintoElectricity
[38] Energy in Australia, 2006, 45.
[39] Sydney Chamber of Commerce Submission to the Owen Inquiry into Electricity Supply in New South Wales., 22 July 2007 available at http://www.premiers.nsw.gov.au/NR/rdonlyres/0260AA61-2E6C-4014-9061-35BCB3DC8641/0/SydneyChamberofCommerce220607dnd.pdf accessed 13 August 2007.
[40] Dr David Hemming, 'Emissions trading Scheme for the NSW Electricity Sector: Rationale, Implementation and Experience to Date', NSW Department of Energy, Utilities and Sustainability', 2.

of new-gas-fired generation plants.[41] The state-wide benchmark has been set at 5% below emissions in the baseline year of 1990.[42]

There are four other abatement schemes currently operating in Australia that directly impact the cost of electricity by targeting electricity retailers, who effectively pass on a substantial portion of the cost to consumers. These are the Federal Government's Mandatory Renewable Energy Target (MRET) scheme, the Queensland Government's 13 per cent Gas (or GEC) scheme and the ACT Greenhouse Gas Abatement Scheme (which largely mirrors the NSW scheme) and the Victorian Renewable Energy Target Scheme.

The Federal Government's Mandatory Renewable Energy Target applies to all jurisdictions in Australia until 2020 and, like the NSW scheme, places the burden on electricity retailers. The scheme imposes an incremental annual target with the aim that by 2020 retailers purchase a combined annual total of 9500GWh (or 4.2 per cent of Australia's total 2010 electricity use) of electricity generated from renewable energy sources.

In September 2007 the Federal Government announced that the government would introduce a single, comprehensive renewable and low-emissions target. This new national Clean Energy Target (CET) would aim at 30,000 gigawatt hours of low-emissions energy generation by 2020. The new CET regime would replace the state and territorial schemes. The scheme would operate as soon as possible but in any event no later than I January 2010.[43]

This followed upon the July 2007 endorsement by the Federal Government of the desirability of instituting an emissions trading scheme with the objective of mitigating greenhouse gas emissions. The scheme was to become operational no later than 2012, and was intended to be the primary mechanism for achieving abatement. The scheme would take the form of a cap and trade mechanism.[44]

The Queensland scheme differs from the previous two schemes by directly specifying the alternative source of energy. In an attempt to guide retailers away from coal-fired base-load power stations, the scheme requires retailers to purchase at least 13 per cent (annually) of electricity sold from the State's new lower-emission, gas-fired generation sources. Retailers will acquire Gas Electricity Certificates (GEC) for each whole MWh of eligible gas-fired electricity and produce them to the Regulator to meet their annual 13% liability. If a retailer fails to do so, they are required to pay a penalty which is calculated by applying a shortfall charge according to the formula specified in the Act (the short-fall

[41] Dr David Hemming, 'Emissions trading Scheme for the NSW Electricity Sector: Rationale, Implementation and Experience to Date', NSW Department of Energy, Utilities and Sustainability', 2.
[42] Dr David Hemming, 'Emissions trading Scheme for the NSW Electricity Sector: Rationale, Implementation and Experience to Date', NSW Department of Energy, Utilities and Sustainability', 2.
[43] www.greenhouse.gov.au/nav/new.html
[44] *Australia's Climate Change Policy*, July 2007 www.pmc.gov.au/publications/climate_policy/docs/climate_policy_2007.pdf

charge is currently $11.40 for each GEC not produced).[45] The Victorian scheme bares closer resemblance to the Queensland scheme than the other schemes as it mandates all electricity retailers and wholesale purchasers of electricity in Victoria to increase their electricity consumption from renewable sources to 10% by 2016.[46]

The Energy Retailers Association of Australia (ERAA) have expressed concerns about the increased cost of these emissions abatement schemes, stating that while the competitive market process would have allowed retailers to recover a much of the increased costs, "the full pass through of these costs is not guaranteed, especially in the case of regulated retail prices which inhibit full cost reflectivity".[47] Moreover, the ERAA has reported that the aggregate result of these uncoordinated schemes is an unequal cost burden on consumers in different states, the highest cost being born by those in NSW.[48] The ERAA report estimated that the annual cost to electricity retailers will increase by between $707m and $965m per year as a result of emissions abatement schemes.[49] Further, the report cited the NSW scheme as the most cost effective of all the schemes, while the Federal Government's scheme was the least cost effective and had average abatement effects. [50]

Mention should be made in this context of the Australian's Government's and later updated in 2004 to the 'Greenhouse Challenge Plus, the program is described as a cooperative partnership between industry and the Australian government to reduced greenhouse gas emissions, accelerate the uptake of energy efficiency, integrate greenhouse gas issues into business decision-making, and provide more consistent reporting of greenhouse gas emissions.[51] In its earlier form, the Greenhouse Challenge was a voluntary program designed to allow private and public companies to set, monitor, control and report their greenhouse gas abatement emissions activities and have their results made subject to independent verification. An annual public statement on overall performance was also required. In return, participating companies could use the

---

[45] Queensland Government Department of Mines and Energy, available at http://www.energy.qld.gov.au/gas_electricity_certificates.cfm accessed 14 August 2007.

[46] *Victorian Renewable Energy Target*, Essential Services Commission, available at http://www.esc.vic.gov.au/public/VRET/ accessed 14 August 2007.

[47] Energy Retailers Association of Australia Inc, *A Report on the Cost to Consumers of Greenhouse Gas Abatement Schemes*, November 2005, 1 available at http://www.eraa.com.au/db_uploads/CosttoConsumersReport(Final).pdf accessed 13 August 2007.

[48] The ERAA calculates increases of between $41.86 to $56.10 on a total annual electricity bill of between $1062.02 and $1076.25 in 2010: Energy Retailers Association of Australia Inc, A Report on the Cost to Consumers of Greenhouse Gas Abatement Schemes, November 2005, 1 available at http://www.eraa.com.au/db_uploads/CosttoConsumersReport(Final).pdf accessed 13 August 2007.

[49] Energy Retailers Association of Australia Inc, A Report on the Cost to Consumers of Greenhouse Gas Abatement Schemes, November 2005, 13 available at http://www.eraa.com.au/db_uploads/CosttoConsumersReport(Final).pdf accessed 13 August 2007.

[50] Energy Retailers Association of Australia Inc, A Report on the Cost to Consumers of Greenhouse Gas Abatement Schemes, November 2005, 1 available at http://www.eraa.com.au/db_uploads/CosttoConsumersReport(Final).pdf accessed 13 August 2007. See also *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May 2007, Chapter 2, 38, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007.

[51] Australian greenhouse Office, Greenhouse Challenge Plus: Programme Framework 2005, 1.

program's logo in their advertising campaigns. The 2005 changes built on the existing structure and obligations but also imposed legally binding Deeds of Agreement with fossil fuel electricity generators that were subject to the Generator Efficiency Standards program.[52] From 1 July 2006, participation in the Greenhouse Challenge Plus became mandatory for Australian companies receiving fuel excise credits of more than A$3 million and for the proponents of large energy projects.[53]

## 6 Proposed Options

The 2007 Prime Ministerial Task Group on Emissions Trading has examined the abatement options currently available and assessed the viability of each option against a standard of significant emissions abatement for minimal cost. The Task Group concluded that the most efficient abatement mechanisms would have to be market-based. While other options such as regulation, the imposition of certain standards and the use of fiscal instruments such as subsidies, grants and rebates were assessed as effective to some extent, such approaches were limited in achieving environmental outcomes and would be 'likely to impose significant costs on business'.[54] In particular, reliance on regulatory approaches was seen to provide no incentive to innovate and invest in new technologies but simply do the bare minimum to meet the imposed standard. Subsidies were also seen as inefficient when applied to national abatement schemes due to their use of taxation monies, resulting in economic and administrative inefficiency. The Energy Networks Association accordingly submitted that:

> While a market based system has the potential to provide efficient price signals for emissions reduction, it is still important to ensure that Australian businesses can take advantage of opportunities to respond to those signals. If businesses are constrained in pursuing emission reductions because of regulation, it will limit the potential benefits that Australia can access from an emissions trading scheme. The ENA therefore considers that the energy reform process currently underway could also consider removing or reforming elements of that regime that may impede energy businesses from pursuing carbon emission reductions.[55]

---

[52] The program applies to all business with a generation plant above the minimum thresholds that use fossil fuels: 30 MW electrical capacity or above; AND 50 GWh per annum electrical output; AND a capacity factor of 5% or more in each of the last three years.
http://www.greenhouse.gov.au/ges/publications/pubs/program_guidelines.pdf

[53] The Greenhouse Challenge Plus program was formerly known as the Greenhouse Challenge program (which commenced in 1995): www.greenhouse.gov.au/challenge/

[54] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May 2007, Chapter 2, 44, available at http://www.pmc.gov.au/publications/emissions/index.cfm accessed 10 August 2007

[55] Energy Networks Association of Australia, Submission to the Prime Ministerial Task Group on Emissions Trading, 7 March 2007, 2, available at http://www.pmc.gov.au/climate_change/emissionstrading/submissions/76_sub_emissionstrading.pdf accessed 20 August 2007

This determination was echoed by a significant number of industry submissions urging for the introduction of emission pricing. It was submitted that an emissions price provides the necessary incentive to abate whenever it is more cost effective to do so. Additionally, studies undertaken by Access Economics and COAG tracking Australia's economic trajectory concluded that emissions pricing provides lower cost abatement than other measures.[56] These reports suggested that the imposition of an emissions pricing scheme in the place of existing schemes including the MRET, GGAS and Queensland's 13 % Gas Scheme emissions price signal would reduce costs by 50 to 75 per cent.[57] Finally, the Task Group concluded that the most efficient abatement scheme would adopt a hybrid model comprising of an emissions trading scheme and carbon taxes. Such scheme would enable companies to take advantage of the market incentive to invest in new technologies to achieve efficient mitigation

The most significant issue for our purposes is that both the Task Group and the majority of interested party submissions strongly advocated that any scheme eventually implemented should be highly flexible, especially with regard to the choice of energy sources used. The continued role of coal as the primary, most reliable and cost effective source of energy production for the next 30-60 years was either explicitly stated or inferred in the suggested renewable energy use models advanced.[58] This was further reinforced by the Task Group's Terms of Reference which stated:

> Australia enjoys major competitive advantages through the possession of large reserves of fossil fuels and uranium. In assessing Australia's further contribution to reducing greenhouse gas emissions, these advantages must be preserved.[59]

The findings of the Allens Consulting Group 2006 report commissioned by the Business Roundtable on Climate Change added further support for the primary importance of coal to Australia's future energy mix, even in the context of deep cuts to greenhouse gas emissions. The report assessed the effects on the Australian economy of reducing greenhouse gas emissions by 60 per cent from year 2000 levels by 2050 (or 80 per cent/714 Mt lower than they would have been without the imposition of a greenhouse target)[60] and found that this could be achieved with a cost of 0.1 per cent to GDP each year from 2002 until 2050 as against a base-case scenario which assessed GDP growth without the implementation of abatement measures.[61] In real terms, the GDP value was

---

[56] Productivity Commission's Submission to the Task Force on Emissions Trading, 39, http://www.pc.gov.au/research/submission/emissionstrading/emissionstrading.pdf

[57] Productivity Commission's Submission to the Task Force on Emissions Trading, 39, http://www.pc.gov.au/research/submission/emissionstrading/emissionstrading.pdf

[58] AGL Submissions, 8, http://www.pmc.gov.au/climate_change/emissionstrading/submissions/66_sub_emissionstrading.pdf; Carbon Planet Submissions, 6 http://www.pmc.gov.au/climate_change/emissionstrading/submissions/69_sub_emissionstrading.pdf ; Urban Ecology Australia; Productivity Commission's Submission to the Task Force on Emissions Trading, 45, http://www.pc.gov.au/research/submission/emissionstrading/emissionstrading.pdf ,

[59] *Report of the Task Group on Emissions Trading*, Prime Ministerial Task Group on Emissions Trading, 31 May 2007, p1. available at http://www.pmc.gov.au/publications/emissions/index.cfm

[60] Allens Consulting Group Report, 28.

[61] Allens Consulting Group Report, 31.

predicted to reach $2.0 trillion in 2050, representing figure 6 per cent lower than that expected using the business-as-usual projection.[62] These figures were obtained by diminishing the proportionate use of coal in the total energy mix and introducing the use of carbon capture and storage technologies, while boosting the contribution of gas and renewables substantially, though nuclear energy was not factored in.[63] However, despite the significant rise in the proportion of other energy sources, especially gas, coal was retained as the primary energy source, with black and brown coal contributing 35% of total electricity generation.[64] Even then, the effect on electricity prices was projected to be an increase of approximately 53 per cent from the base case scenario by 2050 due to the introduction of cleaner and more expensive electricity generation sources as well as carbon prices and/or abatement costs.[65]

These results were compared against a third scenario: a 'delayed actions scenario' under which emissions abatement action with the same target (reducing greenhouse gas emissions by 60 per cent from year 2000 levels by 2050 ) was not taken until 2022, thus requiring a far more dramatic reduction of the use of coal. Instead, gas, biomass and wind energy was required to dominate the energy mix. In this case, GDP was expected to grow at an annual average rate of 1.9 per cent, rather than 2.2 per cent under the base model and 2.1 per cent under the early action model discussed above, representing GDP 13 pre cent lower than the base case projection in 2050.[66] Electricity prices were expected to grow to 175 per cent higher than the base level in 2050.[67]

The continued importance of coal remaining the primary source of energy production for ensuring the buoyancy and growth of the Australian economy is indisputable. CRA International's (CRA) analysis of reducing greenhouse gas emissions in the electricity sector by 2050 also echoed this fact. Like the Allens Consulting Group report, the CRA investigation explored the cost of emissions abatement by comparing the business-as-usual projection figures against a number of scenarios in which the mix of generation technologies and carbon prices were varied. The emissions target was placed at 96Mt of CO2 per annum by 2050, representing a reduction of approximately 80 per cent of emissions that would otherwise be expected in 2050.[68] Despite significant variation in the thirteen alternative scenarios examined against base, business-as-usual scenario, every scenario depicted coal as the major energy source in the energy mix. The report's conclusions stated that:

---

[62] Allens Consulting Group Report, 31.
[63] *Deep Cuts in Greenhouse Gas Emissions: Economic, Social and Environmental Impacts for Australia*, Allens Consulting Group Report to the Business Roundtable on Climate Change, March 2006, vi (hereinafter 'Allens Consulting Group Report').
[64] Allens Consulting Group Report, 39
[65] Allens Consulting Group Report, 42.
[66] Allens Consulting Group Report, 32.
[67] Allens Consulting Group Report, 42.
[68] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006,1-2 available at http://www.pmc.gov.au/climate_change/emissionstrading/submissions/134_sub_emissionstrading_attach3.pdf accessed 19 August 2007.

> "Even with the maximum realistic introduction of renewable technologies and nuclear generation capability, the least-cost path suggests very significant reliance on advanced coal technologies with CCS to achieve 96 Mt by 2050: technologies that are unproven for large-scale applications."[69]

The key role coal needs to play in any cost-effective emissions abatement scheme was further highlighted by the Federal Government's white paper on energy. The government highlighted the fact that much greater capital expenditure leading to increased electricity prices would be required for the introduction of other energy sources such as gas, uranium, wind and solar. Further, while emissions are close to zero from the use of wind and solar energy, the fact that they only provide intermittent energy requires them to be supported (at the very least) by more reliable sources that can meet peak demands as well as the development of affordable storage mechanisms.[70] While gas has been forecast as one of the future dominant energy sources in many models, including the ones above, the use of gas for energy production still remains more costly than coal. This is because while Australia's gas reserves are substantial, the introduction of gas a the major energy source would require significant additions to pipeline and shipping capacities due to the fact that these reserves are situated further away from domestic markets.[71]

The importance of low energy prices for Australia's economy was stressed in the energy white paper, not only with regard to the overall effect on Australian businesses and standard of living costs, but also its effect on investments in resource processing and other energy-intensive industries such as the production of alumina, aluminum, cement, chemicals, metals and minerals processing.[72]

The study also raised the highly controversial role of nuclear power as a cost effective supplement for coal-powered electricity generation. Again, Australia's vast reserves of uranium assisted in the economic efficiency of using such a source. The study concluded that:

> "If CCS and nuclear technology are available at the costs adopted from the international sources used in the study, reducing CO2 emissions to 96 Mt per year across Australia will require commitment to $128 billion of capital expenditure between 2010 and 2050 compared to $78 billion in the unconstrained scenario, i.e. a 64% increase. In the absence of nuclear capacity, capital commitment rises to $150 billion, i.e. a 91% increase in capital commitment over the unconstrained scenario.[73]

The report further reinforced the need for flexibility in the technology choices available for emissions reduction, finding that 'policies …that imposed technology limits to require

---

[69] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006, 11.
[70] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 135, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007
[71] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 135, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007
[72] *Securing Australia's Energy Future*, White Paper, Energy Task Force, 2004, 136, available at http://dpmc.gov.au/publications/energy_future/index.htm accessed 4 August 2007
[73] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006, 10.

use of low or renewable technologies incurred incremental costs up four times higher than the cost for the same reduction without restricting the technology choice'.[74]

It follows that the introduction of the emissions constrains in the form of carbon taxes and emissions trading schemes will also have a powerful impact on electricity generators. The CRS report found that a $35/t price for carbon dioxide can result in an added cost to the generation sector of $72 billion including $53 billion of transfer payments.[75] It thus becomes crucial for an abatement scheme designed to have the least negative effect on the competitive price of electricity to introduce complementary fiscal policies that reduce the commercial effect of such transfer payments on the generation sector such as sensible allocation of emissions trading permits and/or tax rebates rather than simply relying on increased electricity market prices.[76] Such a step is assisted by the fact that the introduction of a carbon price would generate a new and substantial revenue stream for the government.

## 7 A Case study – Can a Coal Rich Country Renounce Coal as a Source of Future Electricity Supply?

The Owens Inquiry into Electricity Supply in New South Wales[77] (the most populous state in Australia and one of the leading coal mining states) reported in September 2007. The Inquiry was appointed to assess the future baseload electricity generation requirements of New South Wales and the most efficient means for ensuring that there would be adequate investments funds to meet these requirements. The Inquiry reported that by 2013-2014 NSW would need an additional 13% of generating capacity compared to current consumption, an amount equivalent to that which would be generated by a new power station.[78] Most electricity in NSW is currently generated by coal fired power stations. The Inquiry reported that most of the new generating capacity would need to be in the form of coal fired and/or gas fired power stations. Other technologies would only be able to supply a relatively small part of the new base load capacity by 2013-2014.[79] Investment in new base load generation in NSW needed greater regulatory certainty about an emissions trading scheme[80] (there is bipartisan support from the two major political parties in Australia for the introduction of an emissions trading scheme). In particular, this could influence the choice of coal (higher C02 emissions) and gas (CO2 emissions less than half that of coal[81]). At current prices gas was more expensive than

[74] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006, 10.
[75] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006, 11.
[76] CRS International, *Analysis of Greenhouse Gas Emissions in the Australian Electricity Sector*, September 2006, 11.
[77] *Owens Inquiry into Electricity Supply in New South Wales*, released Sept 2007. www.premiers.nsw.gov.au/WorkandBusines/DoingBusinessinNSW/OwensInquiryintoElectricity

[78] Ibid at p1-7.
[79] Ibid at p1-8. See also pp2-23, and p3-5ff, noting the limited scope of existing renewables technology to supply base load power.
[80] Ibid at p1-10.
[81] Ibid at p3-19.

coal, as a source of a given amount of electricity. There was a significant degree of uncertainty regarding gas prices. In favour of the economics of gas, it was cheaper to build a gas fired power station of given capacity than a coal fired station of the same capacity.[82] Potentially, then, gas could replace coal, but this of course is only possible where there are assured and reliable sources of gas. The Inquiry supported introduction of an emissions trading scheme but not a carbon tax.[83] The Inquiry explored the role of carbon sequestration.[84]

In summary, the Inquiry concluded that coal or gas was needed to supply base load power, having regard to present immaturity of renewable technologies.

## 8 The Future of Coal

Coal is cheap and abundant. It is clearly going to be the dominant source of electricity supply into the foreseeable future. It will also generate an increasing amount of greenhouse gas. Abatement measures include increasing resort to renewable technologies as they mature, carbon sequestration technology and other carbon sinks, and energy efficiency regimes. Emission trading regimes and/or carbon taxes will promote these abatement measures.[85] It is apparent that technologies for sequestering carbon dioxide produced by coal fired power stations are in their infancy but provide significant long term potential for carbon abatement.[86] Nuclear power is an important source of electricity in a range of countries that produces greenhouse gas free electricity, but its used in Australia will be constrained by political factors.

[82] Ibid at p3-18, p3-27.
[83] Ibid at Chap 5.
[84] Ibid at p3-19.
[85] *The Future of Coal – Options for a Carbon Constrained World*, MIT, 2007, at p95, suggested that a significant reduction of carbon emissions is possible only when a significant price is placed on C02 emissions, proposing that a global carbon charge starting at $25 per tone of C02 emitted (or nearly $100 per tonne of carbon) be imposed in 2015 rising at a real rate of 4% annually thereafter.
[86] See the *Owens Inquiry into Electricity Supply in New South Wales*, released Sept 2007. www.premiers.nsw.gov.au/WorkandBusines/DoingBusinessinNSW/OwensInquiryintoElectricity at p3-19; *The Future of Coal – Options for a Carbon Constrained World*, MIT, 2007, p13, Chap 4, and noting at p59 that the "prospect for geological C02 sequestration is excellent".