# A Climate of Change: Ecological modernisation and the politics of carbon trading in Australia

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### **Abstract**

Climate change has been cast in many different roles - from a global swindle to a comprehensive market failure. It has even been suggested that this is the great moral challenge of our time. The school of ecological modernisation (EM) reconstructs the issue as a challenge that has been generated by inefficiency. It proposes better technological and institutional design as the core of an effective response. The focus of this paper is on mitigation strategies at the national level, with particular attention paid to carbon trading (also known as greenhouse gas emissions trading systems). The history that led to the Rudd Government's Carbon Pollution Reduction Scheme and the resistance to this policy is discussed. This paper outlines five program themes of strong EM: technological innovation; engaging with economic imperatives; political and institutional change; transforming the role of social movements; and, discursive change. These themes are then used to analyse the development of climate policy in Australia. Overall it is argued that reconstructing the issue using strong EM is a strategy that can overcome the current resistance to carbon trading by selling the change as a win for both business and the environment. Further, it offers the opportunity to identify significant policy improvements.

## Introduction

'May you live in interesting times' is a curse<sup>1</sup> that could certainly apply to our lifetime. We have witnessed the end of end of the Cold War and the start of the War on Terror, an international economic boom and bust, rapid technological change, and, of course, the emergence of global environmental problems. This last set of issues includes the worldwide loss of biodiversity, deforestation, soil erosion, freshwater scarcity, pollution, depletion of the ozone layer, and climate change (UN 2005; UNEP 2007; IPCC 2007). Of all these, climate change has emerged as one of the most serious as it has the potential to exacerbate all of the other environmental and social<sup>2</sup> problems mentioned above (Stern 2006; UNEP 2007; Garnaut 2008). On top of this, climate change has proved to be a 'wicked' policy issue because it is difficult to define, complex, interconnected, and many proposed solutions may have unintended negative consequences (Rittel & Webber 1973; Althaus, Bridgman and Davis 2007).

As this paper is being written the world's political leaders are engaged in several rounds of negotiations in an attempt to find an international response to climate change. News from the negotiations oscillates between optimism and pessimism as the key players jockey for position (Colitt 2009; Doyle 2009a). At the same time the Australian Government is struggling to get its Carbon Pollution Reduction Scheme through parliament with the opposition using its numbers in the Senate to delay voting

<sup>1</sup> The phrase is popularly believed to be based on an ancient Chinese proverb but this has been disputed and it may in fact have originated in the English speaking world in the early part of the 20<sup>th</sup> century.

<sup>&</sup>lt;sup>2</sup> The term 'social' is used here in its broadest sense to include the economic and political realms – as in the broad church of 'social science' studies.

then rejecting the first version of the bill (Taylor, R. 2009; ABC 2009). Added to this is the pressure-cooker politics of vigorous interest group lobbying at both the national and international level accompanied by intense press coverage. On one side, the majority of climate scientists and environmentalists warn of a looming crisis if emissions are not curbed quickly (CIA 2009a; CSIRO 2009). On the other side, sceptics and business groups either question the science and/or highlight the economic costs of reducing greenhouse gas emissions (Doyle 2009b; MCA 2009).

This paper proposes a way out of this 'wicked' policy malaise. The basic argument is twofold. First, reconstructing the general view of the problem in the light of strong ecological modernisation (EM) would allow both sides of the debate to see a 'win-win' scenario that would help to overcome resistance to change. Second, the program themes of strong EM can be used to identify significant improvements in the current climate policy regime. The following section briefly summarises the issue of climate change. Section two then tracks the history of Australian climate policy from 1985 to 2007. In section three the current Carbon Pollution Reduction Scheme (CPRS), its associated programs and its delay are discussed. The last two sections then outline the strong ecological modernisation alternative, identify five core program themes and demonstrate how they can be applied to the problem to support more effective action and overcome resistance to change.

## 1) The problem of climate change

Since the industrial revolution human activity has increased the concentration of greenhouse gasses in the atmosphere, largely due to the extensive burning of fossil fuels, and the majority of current scientific research suggests that this has enhanced the greenhouse effect to the point where the global climate is changing (IPCC 2007; Australian Government 2007; Garnaut 2008). If this situation continues average temperatures and sea levels will rise (IPCC 2007; Stern 2006). The impacts on Australia will be significant. In the most highly populated regions of the southeast rainfall and fresh water supplies will become even more scarce, bushfire intensity and frequency will increase, and droughts will be more common and severe. These changes will lead to a significant reduction in production from agriculture and forestry (Stern 2006; Garnaut 2008). The wet tropics in the north will face increased flooding and more cyclone activity resulting in further agricultural losses, property damage as well as increased rates of injury and death. The Great Barrier Reef will be at risk of large scale bleaching and coastal settlements, which comprise the majority of Australia's cities and urban areas, will face a greater risk of flooding and storm surges. This will result in increased insurance and repair costs as well as greater investment in public infrastructure such as flood barriers. There may also be increased health costs if tropical diseases move south into more populous zones and vectorborne diseases such as malaria increase concurrently (Hennessey, et al, 2005; Mercer & Marden 2006; Stern 2006; IPCC 2007; Australian Government, 2007).

Some climate change is inevitable due to the greenhouse gasses that have already been added to the atmosphere, but the situation could be stabilised and the worst impacts avoided by a significant change in development trajectory (IPCC 2007; Australian Government 2007). Stern (2006, vi-ix) suggests that this would require a reduction in net emissions of 60% by 2050 and 80% by the end of the century. This means cuts in global emissions from the energy, transport, industrial and building

sectors, as well as changes to land management practices to improve carbon sequestration by plants (e.g. an end to land clearing, increased reafforestation, and changes to agriculture). Stern (2006, vi) estimates that it will cost 1% of current global GDP each year from now on to make the necessary changes, otherwise by 2050 the world economy could be spending up to 20% of current GDP annually to deal with the worst consequences of the higher rates of warming.

## 2) A brief history of Australian climate policy 1985-2007

Christoff (2005) identified four main phases in Australia's national response to climate change. First, there was a period of 'naïve altruism' that started with the first formal recognition of the risk of global warming in 1985 and ended in 1994, two years after the adoption of the UN Framework Convention on Climate Change (FCCC) and the National Greenhouse Response Strategy (NGRS). This period saw the Labor Government overoptimistically commit the country to a cut of 20% on 1988 levels (Christoff 2005).

The second period of 'fossil fuel pragmatism (1994-2000)' saw these policies fail and the change to a conservative Howard Government in 1996 that was sceptical of climate science. It framed the problem in terms of economic costs and national interests (Christoff 2005). It was during this second phase that Australia reluctantly signed the 1997 Kyoto Protocol. The Government's submission to Kyoto was based largely on economic modelling from the Australian Bureau of Agricultural and Resource Economics (ABARE) that had strong links to industry (Bulkeley 2001). A more modest National Greenhouse Strategy was adopted in 1998 and the Australian Greenhouse Office was created to collect emission data and implement the Greenhouse Challenge, a voluntary reduction programs for industry. Bulkeley (2001) refers to this period as a phase of 'no regrets' policy making where the Government actively sought to avoid imposing costs on industry.

The third phase of climate policy, 'policy wobbles and fragmented coalitions (2000-2002)' was where the industry position began to fragment as individual firms shifted their position away from outright opposition (Christoff 2005). It was during this period that the USA announced that it would not ratify Kyoto and Australia followed suit.

The fourth phase started in 2002 and has acted to 'entrench the line' of the Australian Government's resistance to both domestic and international supporters of the Kyoto Protocol (Christoff 2005). It was during this time that a so-called 'climate mafia' of business lobbyists claimed to be writing policy for the government (Cohen 2006; Pearse 2008; Pearse 2009).

I would suggest that we add a fifth phase - 'policy frenzy' - that began in 2006 after the first meeting of the Asia-Pacific Partnership on Clean Development and Climate (AP6) between Australia, the USA, Japan, South Korea, India and China (Australian Government 2007). This move was an attempt to develop an alternative to Kyoto and provide a foil for deflecting growing public criticism (McGee & Taplin 2006). The Australian public's interest has risen rapidly since early 2006 (Smith 2007; Woolcott 2009) due to a number of factors: the release of the highly publicised climate film *An Inconvenient Truth* featuring Al Gore, the adoption of water restrictions along the

most populous east coast cities after five years of drought that some commentators linked to climate change, a constant stream of media coverage, and the release of the Stern (2006) and, later, the IPCC (2007) reports. By mid-2007 this had produced a blizzard of national policy announcements with funding for more climate science research, programs to support the development of 'clean coal technology', the establishment of renewable energy demonstration projects, a lively discussion about whether to develop nuclear power, and planning for the adoption of a national greenhouse gas emissions trading system, more commonly known as carbon trading (Australian Government, 2007).

## 3) The Carbon Pollution Reduction Scheme (CPRS)

In many ways the national election in late 2007 marked a further turning point for Australian climate policy as it appeared that a consensus was emerging on the need to adopt a 'cap and trade' carbon trading system. Such a system requires the Government to create a new market where firms have to buy a permit for each tonne of greenhouse gas they emit. The Government sets a cap on the total number of permits they auction each year and this reduces over time to meet a long-term target. Firms that reduce their emissions can either buy fewer permits or sell their surplus. Businesses therefore have an incentive to reduce emissions in order to cut costs and stay competitive, but they decide if it is cheaper to reduce emissions or buy permits – allowing reductions at the least cost (Stern 2006; Garnaut 2008).

The idea of carbon trading emerged during the negotiations leading up to the 1997 Kyoto protocol. It was first put forward by the USA, which had already used tradeable emission permits to phase out lead in petrol and reduce sulphur dioxide emissions (BIE 1992; Weiner 2004; Howes 2005). The concept was incorporated into Kyoto through the Clean Development Mechanism that allowed wealthier states to offset their national emissions by paying for poorer states to avoid increases in their net emissions. This could involve the deployment of low emission technology (e.g. building renewable energy systems instead of coal-fired power stations), the protection of forests that absorb greenhouse gasses, or changes to land management practices that reduce methane emissions. A small, voluntary cap and trade scheme was trialled in the UK in 2001 and the EU adopted a scheme in 2005 that now applies to all of its 27 member states (Von Malmborg & Strachen 2005; ENVIROS Consulting 2006).

In Australia, it was the State and Territory Governments that took the early initiative in the absence of interest by the national Howard Government. NSW introduced a baseline and credit scheme in 2003 that was extended to the ACT in 2005 (IPART 2008). Under this scheme forty of the major power producers and users were required to either reduce emissions or buy offsets for each tonne of greenhouse gas released above a set baseline. In 2004 the State and Territory Governments formed the National Emissions Trading Taskforce that proposed a national 'cap and trade' scheme along the lines of the EU model. This was initially ignored by the Howard Government but in 2006 all governments agreed to a National Greenhouse Energy Reporting Scheme (NGERS). This scheme required 1000 of the largest emitters (that constituted about 70% of national greenhouse gas releases) to estimate and publicly report their emissions annually (Australian Government, Department of Climate Change 2009).

Meanwhile, the Rudd Labor opposition worked with the State and Territory Labor Governments to employ Ross Garnaut to undertake an analysis of a carbon trading system for Australia. In the lead up to the 2007 election both Howard and Rudd announced that they would adopt a carbon trading scheme if elected and support research into carbon capture and storage as a way to support the coal industry. Howard refused to set targets, but Rudd announced that by 2050 it would reduce emissions by 60% on a 2000 emission baseline (Kelly 2007). Further, Rudd promised to raise the mandatory renewable energy target from 2.5% (set by the Howard Government) to 20% by 2020.

When the Rudd Government took office in 2007 it set about implementing its climate policies. Within a few months the AP6 was sidelined, the Government had committed itself to increasing the renewable energy target to 20%, Australia had rejoined Kyoto and Garnaut was now officially engaged by the Commonwealth to run the carbon trading policy review. In 2008 he released draft and interim reports for public comment that proposed a carbon trading system start in 2010 covering all the greenhouses gasses listed under Kyoto (Garnaut 2008). The scheme would require the 1000 emitters covered by the NGERS to be involved with energy, industry and transport as the main sectors being covered. Forestry could opt into the scheme to provide offsets by growing trees that absorb carbon dioxide. Agriculture was initially excluded but this was to be revised in 2013 for possible inclusion from 2015. The Government green paper was released in July, followed by Garnaut's final report and the treasury modelling in October. After further public consultations the Government white paper was released in December.

Under this policy the Government would establish a new authority that would auction permits four times a year. There would be an initial price cap, but this would be relaxed in subsequent years and the market would set the price. Firms had to reconcile their emissions with the number of permits to be surrendered by June 30 each year. Permits were vintaged and could be held for use in any year after their issue. Anyone could buy permits, bank them, sell them or invest in a futures market. Firms that exceeded their permits could buy extra the following year to cover the deficit. A gateway range of total emission targes would be set every five years. While the final target was still 60% reduction by 2050, a modest interim target range was set at a minimum of 5% and a maximum of 15% (later revised to 25%) depending on the international agreement to be struck at Copenhagen in late-2009. Firms that were energy intensive and trade exposed (e.g. steel manufacturers) would be given between 60-90% of the permits for free and some of the money raised from the sale of permits would be given to them as compensation. The energy sector would also be given money to help them invest in cleaner technology and some funds would be invested into researching carbon capture and storage (Australian Government, Department of Climate Change 2008).

Treasury modelled two scenarios at prices of \$23 and \$52 per tonne of carbon dioxide equivalent. The modelling suggested that real GDP would grow 0.1-0.2% pa less rapidly. There would be a one off spike in inflation of 1.0-1.5% and the average household would spend and extra \$6-7 per week on energy bills. Growth in household income would grow 0.2% pa less rapidly (Australian Government, The Treasury 2008).

Debate around the scheme was intense. On one side the Business Council of Australia (2008) surveyed 14 energy intensive trade exposed firms. It argued that a permit price of \$40 per tonne of carbon dioxide equivalent would cause three firms to close. Four other firms would lose 32-63% of pre-tax earnings and the rest would cut their investment in Australia. The Minerals Council of Australia estimated that the scheme would impose a '\$30 billion burden' on Australian businesses in the first four years and lead to the loss of 23,510 jobs by 2020 and 66,3480 jobs by 2050 (MCA 2009). On the other side of the coin the Australian Council of Trade Unions & Australian Conservation Foundation released a joint study that suggested 500,000 extra jobs would be created by 2030 in renewable energy, energy efficiency, sustainable water systems, biomaterials, green buildings, waste and recycling. Further, the Climate Institute of Australia (2009b) countered the Minerals Council argument with a study that showed 26,200 regional jobs would be created by the expansion of the renewable energy sector.

While the initial public response to the CPRS was positive in 2008 as the global financial crisis started to grab attention in 2009 this support started to wane and people began to worry about potential job losses (Woolcott 2009). The Government was forced to delay the start of the scheme to 2011, switch to a lower fixed carbon price of \$10 per tonne in the first year and offer more free permits (66-94.5% depending on the firm) and more compensation to business. To placate environmentalists the upper limit of the interim target was raised from 15% to 25%, but this was to be achieved via the purchase of international carbon credits (Wong 2009; Pearse 2009). The Coalition, now in opposition under the leadership of Malcolm Turnbull, argued that the costs would be too high and that any policy should be delayed until after the global agreement was struck at Copenhagen (ABC 2009). The Greens, on the other hand, saw the scheme as too timid. The Government pushed ahead and brought the CPRS and renewable energy target bills jointly to the senate in June 2009 when the opposition successfully delayed a vote. More recently the leader of the opposition revised his position and suggested that he might let the legislation pass with amendments (Daly 2009a). The package of bills was rejected in August but there were signs that the opposition stance was softening its line after the Government agreed to separate renewable energy from the CPRS for individual negotiation and continuing public support for the Government (Taylor, L. 2009). The renewable energy bill was passed on 21 August with minor modifications.

The question now is who will blink first? Will the opposition strike a deal and let the bill through? Will the Greens get the Government to set stricter targets? Will the Government give up and blame both the Greens and opposition for wrecking the scheme? One way around this deadlock is to reconstruct the nature of the issue. If the main policy players could be convinced that climate change was an opportunity to make the economy more efficient the resistance would be greatly reduced. This would require jettisoning the 'jobs versus environment' view of climate change, a restructuring of the economy to generate strong rewards for change, and a reformation of the political system to break the stranglehold of recalcitrant sectors of business on policymaking. Ecological Modernisation (EM) offers a theoretical framework that supports such transformations. Further, it can be used as a guide to design better policies to assist in the transition strategies to a more sustainable world.

# 4) The Ecological Modernisation (EM) alternative

Let us take a step back for a moment and acknowledge that government policies and their complementary schools of thought obviously do not develop in a vacuum. They are very much a product of their times, reflecting broader social trends. The disenchantment of the 1960s that spurred on the labour, civil rights, peace and women's movements also reinvigorated environmentalism that diversified and transformed itself with each successive decade (Hutton & Connors 1999; Doyle & McEachern 2001; Dryzek, et. al. 2003). Over time an array of lobby groups, nongovernment organisations, protests, boycotts, legal actions, and political parties emerged to challenge the status quo in local, national and international arenas (Doyle & Kellow 1995; Howes 2005). The state eventually reacted by creating new policies and agencies. These responses, however, were constrained by the limited ability of governing institutions designed largely in the 19<sup>th</sup> century to respond to such 'wicked' late-20<sup>th</sup> century problems (Beck 1992; Toyne 1994).

There were, of course, subsequent broader shifts in the structure of the state and its underlying rationale. The administrative rationalism of the 1970s that encouraged large public sectors and state interventions in the market gave way to economic rationalism in the 1980s (Paehlke & Torgerson 1990; Pusey 1991). Public enterprises were sold off, the bureaucracies were slimmed down, and markets deregulated. Environmental policies also shifted in line with these changes with the rise of marketbased programs such as tradeable emission permits (Eckersley 1995; Howes 2005). The 1990s saw another shift in rationale towards what Giddens (1998) referred to as 'The Third Way' – an idea that encouraged governments to experiment with publicprivate partnerships and greater community engagement. This idea was taken up with gusto by the Blair Government in the UK (Giddens 2002) but the Australian Howard Government adopted a more complicated approach. The sale of Telstra, for example, was straight off the economic rationalist menu but the Natural Heritage Trust that it funded supported community engagement with a distinctly 'Third Way' flavour (Howes 2005; Howes 2008). The Rudd Government appears to have moved more towards a 'Third Way' approach to public policy with initiatives like the Australia 2020 Summit, although the implementation of the ideas generated has been very slow (Australian Government 2009).

Although it had emerged in the 1980s, the idea of sustainable development only began to dominate the rhetoric of global environmental policies in the 1990s (WCED 1987; Dryzek 1997). The essence of sustainable development was threefold: it acknowledged the link between environmental and social issues; it proposed an integrated response; and, it offered a framework strategy for the prevailing institutions of power to be redeemed (Howes 2005). The European school of Ecological Modernisation (EM) also emerged in the 1980s (Weale 1998; Hajer 1995; Mol & Sonnenfeld 2000; Mol & Spaargaren 2000) and appeared to provide a theoretical underpinning for sustainable development policies. Similar ideas emerged in the USA under banners such as Natural Capitalism, Biomimicry and Industrial Ecology but these tended to have a stronger market focus (Howes, et. al. 2009). The underlying assumption of them all was that there didn't have to be a trade-off between environmental quality and economic prosperity (Gouldson & Murphy 1997; Curran 2001)

Ultimately EM treats all environmental issues, climate change included, as a challenge to eliminate inefficiency via better design. It promotes the use more ecoefficient technology as well as the redesign of economic and political institutions to create incentives that will effectively decouple economic growth from raw material use, waste and environmental damage (Berger 2001; Dryzek 2005; Howes 2005). Waste is seen as an indicator of inefficiency. Businesses use their desire to cut costs by innovating to find new ways of reducing their raw material and energy use, cutting pollution in the process. Governments correct market failures that encourage environmental damage and create incentives to innovate by penalising damaging behaviour and rewarding eco-efficient improvements. They also act as clearing house for information about the state of the environment and support the research, development and deployment of better technologies. The actions of the market and the state together work in partnership to develop a cleaner, low cost future that is good for both business and the environment (Blowers 1997; Weale 1998; Mol & Sonnenfeld 2000; Lundqvist 2000).

In its early days, EM had a very strong focus on technology and relied on the authority of experts to find and impose solutions. It was often criticised for being 'techno-corporatist' and suspected of being economic rationalism in disguise. In the intervening decades, however, EM has grown to encompass a spectrum of different theoretical models (Christoff 1996; Dryzek 1998; Fisher & Freudenberg 2001). The stronger variants advocate quite significant structural transformations of the market and the state and even wander into the realms of ecological democracy (Dryzek 1987; Mol & Spaargaren 2000; Howes 2005). The definition of strong EM, the ensuing debates, and a typology of the range of variants have been dealt with elsewhere, so this paper will use the five core program themes outlined in Howes, et. al. (2009) as a starting point: technological innovation; engaging with economic imperatives; political and institutional change; transforming the role of social movements; and, discursive change.<sup>3</sup> Together these themes both describe the core elements of strong EM and give an indication of its accompanying program for action. These themes are expanded in the next section where it is argued that they can be used to reconstruct the 'wicked' policy problem of climate change in a way that both sides of the debate see a benefit in taking effective action to reduce greenhouse gas emissions. Further, they are used to identify significant policy improvements.

# 5) EM & Australian climate policy

The brief history of Australian climate policy outlined in sections two and three indicates that both sides of politics have been committed to encouraging technological development and supporting economic growth. This gives EM 'a foot in the door' in terms of being able to revitalise the climate policy making process because it is in accord with these bipartisan sentiments. Further, EM has good chance of influencing decision makers since it frames the debate in non-threatening terms by supporting industrial development, the market and liberal-democracy (Howes 2005). In essence strong EM strategically supports the existing institutions of power and modest initial reforms, but it also prepares the groundwork for substantial transformations later.

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<sup>&</sup>lt;sup>3</sup> These themes recur throughout the EM literature but are particularly evident in Berger, et. al. (2001) and Welford & Hills (2003).

Consider the program theme of technological innovation. Strong EM proposes this as the first necessary, but not sufficient, step towards sustainability. The aim is to encourage industry to research, develop and deploy more eco-efficient technology. This new technology should reduce raw material and energy use, cut emissions, eliminate the use of hazardous materials and the production of toxic waste, wean production off the depletion of non-renewable resources, sustainably harvest renewable resources, conserve biodiversity, and protect essential environmental services. The economic benefit derived for business is to reduce the costs of raw materials, energy use and waste disposal (Mol 2000; Berger, et. al. 2001; Fisher & Freudenberg 2001; Welford and Hills 2003; Cohen 2006). In a nutshell, strong EM advocates technological innovation that decouples economic growth and industrial development from environmental damage – a cleaner industrial revolution.

Australia is starting from a relatively low level of technological eco-efficiency. Although this country is responsible for only 1.4% of the total global greenhouse gas emissions it has one of the highest rates of emissions per capita in the world (Australian Bureau of Statistics 2007a; Mercer and Marden 2006; Bulkeley 2001). In terms of investment in new technology, the Howard Government spent \$1.9 billion over 10 years, mostly on voluntary programs, which is less than 0.03% of GDP (Australian Bureau of Statistics 2007b; Howard, et al, 2006b; Australian Government 2007). The Rudd Government maintained the \$500 million carbon capture and storage research funds allocated by Howard and created a \$2.15 billion Climate Change Action Fund, with \$1.4 billion to be given to businesses over five years for investment in cleaner technology (Australian Government 2008). While there is a rhetorical emphasis on new technology Australia historically has not invested very much in its research and development by OECD standards (Howes 2005). Further, much of what is currently allocated is being directed to waste disposal solutions, such as carbon capture and storage, rather than decoupling economic growth from raw material use and non-renewable resource depletion. The new 20% renewable energy target will expand encourage the deployment of existing technologies but may not spur on the development of new technology.

This situation can, however, be turned to advantage by adopting a strong EM stance. First, high per capita emissions suggest that there is a lot of 'low hanging fruit' to be gathered in terms of eco-efficiency for very little cost. There are many opportunities for 'win-win' scenarios where firms invest in energy efficient technology that also reduces their operating costs (Hargroves & Smith 2005; McNeil 2009). Second, the funds allocated to cover transition costs could be retargeted as an opportunity to diversify into the emerging greener technologies, rather than simply being given as compensation. Third, instead of wasting CO<sub>2</sub> emissions from existing power stations by developing carbon capture and storage technology, treat it as a resource. Reallocating some of the \$500 million into the development of algal systems that convert the gas into bio-fuels and animal feed, for example, would be one option that would allow the carbon to be used twice, significantly cutting emissions and reducing non-renewable resource use. (A pilot project is already underway and is currently funded by \$160,000 from the Queensland Government (2008)). Strong EM therefore has the potential to reconstruct the technology barriers as opportunities and gives policy makers some guidance as to what should be targeted. It might also win business over by identifying new opportunities for profit making.

In terms of engaging economic imperatives, the idea is to harness market forces and steer them in a direction that encourages eco-efficiency. This starts with internalising the externalities of environmental damage (e.g. making the polluter pay for the damage done) but moves on to creating substantive incentives for producers to go beyond compliance with environmental laws while encouraging both consumers and investors to support greener firms (Gouldson & Murphy 1997; Mol 2000; Mol & Sonnenfeld 2000; Mol & Spaargaren 2000; Seippel, 2000; Berger, et. al. 2001). In this new green market a healthy environment is seen as essential for a healthy economy.

It is not clear whether the Howard Government's AP6 programs would have really encouraged more investment by industry in cleaner production but there were other programs at work. On the energy conservation side, the former Australian Greenhouse Office encouraged firms to reduce their energy consumption with a voluntary program called the *Greenhouse Challenge* that attracted some 700 participants. The Howard Government also committed \$200 million to stop deforestation in Indonesia (Howard, et al, 2007). In 2001 the Howard Government passed the Renewable Energy (Electricity) Act which required all energy providers to source 2.5% of their supply from renewable sources. This created a market for renewable energy certificates that were sold to the major energy providers but the target was so modest that it was easily met without a significant increase in energy prices (Kent & Mercer 2006). The then Minister for Industry, Ian McFarlane, argues that this led to a \$3 billion investment in the wind energy industry in Australia but rejected the need to increase the target (Holmes 2007). Brad Page, the CEO of the Energy Supply Association of Australia argued that the target could be raised to 20% to be met by 2020 with an increase of only 4-6% of retail energy prices (Holmes 2007). This can soon be tested with the adoption of the higher target by the Rudd Government. When the bill passed recently it was claimed that there would be an investment of \$28 billion in the sector and the creation of 28,000 new jobs (Daly 2009b). Perversely, however, estimates of subsidies to various parts of the fossil fuel industries suggest that these high emissions sectors are still receiving between \$6.5 billion and \$8.9 billion in public support (Riedy & Diesendorf 2003, 135; Kent & Mercer 2006, 1052; Pearse 2009).

The idea of putting a price on greenhouse gas emissions to act as a disincentive is in accord with EM principles, however, it is undermined by the willingness of both major parties give permits away free and subsidise major polluters. Under a strong EM approach, for example, subsidies to the fossil fuel sector might be substantially reduced and the money saved could be shifted to supporting the infrastructure needed by the renewable energy sector (e.g. providing transmission connections for new geothermal plants to the national grid). The remaining subsidies could made contingent on the fossil fuel industry diversifying their income into renewable energy. Further, what the CPRS could be integrated into a revised taxation system. The Government announced a comprehensive review of the taxation system in May 2008 that is still ongoing. What if the corporate tax rate for energy intensive trade exposed firms were reduced to offset the cost of buying permits? This would reduce the need for subsidies and free permits, provide a strong incentive to reduce emissions, and offer the opportunity for the firms to be more competitive by effectively reducing the total tax-plus-CPRS costs by adopting eco-efficiency measures. Taking this kind of strong EM approach would help to sell carbon trading to industry as it is both simpler and a chance to reduce the net government impost on profits.

The third program theme of strong EM is political and institutional change. The importance of the state in steering the development trajectory is acknowledged and it is proposed that the institutions of government be restructured to allow for more democratic, decentralised and participatory decision making. The centralised 'top-down' government hierarchy is replaced by more open, collaborative structures that engage community and business in constructive partnerships (Christoff 1996; Gouldson & Murphy 1997; Mol 2000; Mol & Sonnenfeld 2000; Mol & Spaargaren 2000; Buttel 2000; Mol and Sonnenfeld 2000; Berger, et. al. 2001; Fisher & Freudenberg 2001; York and Rosa 2003). The overall aim is to create an institutional context for governance that is flexible and innovative, thus preventing policy making from becoming ossified, out of touch or captured by powerful economic interests.

In terms of political and institutional change, the Howard Government's AP6 and Climate Challenge programs did cast the Government in the role of facilitator or partner with industry that is working to reduce greenhouse gas emissions - something that is in accord with EM. The low level of funding that has continued under the Rudd Government, however, indicates that there has not been a significant shift in priorities, something that would be encouraged by EM. Further, there is little evidence of a substantial restructuring of government institutions (apart from the creation of the Department of Climate Change), no apparent increase in flexibility, only limited public input, and no decentralisation to empower local communities. This suggests that the Australian Government's response to climate change falls a long way short on the strong EM prescription.

What appears to be happening is that the government policy making has been heavily influenced and delimited by a coal industry that has a strong position of power within the national economy and feels threatened by proposals to decouple fossil fuel use from economic growth (Kent & Mercer 2006; Mercer & Marden 2006; Curran 2007; Pearse 2009). Even supporters of the coal industry and the Howard Government have become concerned about the ability of a few business leaders to constrain climate policy (Cohen 2006; Pearse 2007; Pearse 2009). Australia is going to have to make more substantial structural changes to its economy than European countries if it is to ecologically modernise because it is more dependent on extractive industries and has been very slow in planning and implementing change. Australia is caught in a Catch 22 situation, however, because implementing these changes will require a government that has itself been restructured so that it is capable of overcoming the resistance of industries that hold great economic and political influence. The full extent of this restructuring is beyond the capacity of this paper but has been covered in many other works across many countries (see, for example: Dryzek 1987; Hajer 1995; Giddens 1998; Dryzek, et. al. 2003; Hargroves & Smith 2005; Howes 2005; Brown 2008; McNeil 2009).

Transforming the role of social movements is the next program theme of strong EM that relates to the political and institutional changes of the previous theme. The idea is to empower non-government organisations so that they are able to provide an effective early warning system for emerging problems and feed innovative ideas into the decision making process (Hajer 1995; Mol 2000; Mol & Sonnenfeld 2000; Fisher & Freudenberg 2001). The goal is to generate an effective social and environmental feedback mechanism for policy makers.

Transforming the role of social movements in Australia will be difficult. While business has been intimately involved in climate policy making, environmental groups, labour organisations and other community groups were deliberately excluded 1996-2007 under the Howard Government. The electoral success of the Greens in the Australian Senate and some state parliaments has put pressure on both government and opposition to change policies, but the Howard Government still resisted community pressure to rejoin Kyoto or take stronger measures on climate change (Christoff 2005). The Australian Labor opposition was quick to seize the initiative in opposition and held a climate forum in Canberra that included representatives form all levels of government, business, environmental groups, unions, and researchers (ALP 2007). When in government the Rudd regime did host the Australia 2020 Summit but there seems to be little concrete evidence of substantial policy changes emerging from this forum so far (Australian Government 2009). Further, the Carbon Pollution Reduction Scheme was watered down in 2009 under heavy criticism from the coal and mineral sectors.

If strong EM were to become the prevailing framework for viewing the climate change issue, governments would be more inclined to support community empowerment as a way to harness it problem solving potential. Business resistance to such a change might be tempered by the idea that bringing these groups into the process might actually reduce resistance to future projects (Dryzek, et. al. 2003). It would also allow for constructive partnerships between government, business and community groups to be formed that could actually facilitate policy implementation and industrial development.

The final program theme of discursive change is an attempt by strong EM to recast both the perception and discussion of environmental issues in a way that encourages cooperation between both sides of the debate. The aim is to break the hold of the 'jobs versus environment' view and reconstruct issues as an opportunity for both economic growth and environmental sustainability. It is argued that more jobs can be created in the emerging green sectors of the economy, while the older sectors can benefit by adopting new technology to reduce both their costs and waste (Gouldson & Murphy 1997; Mol 2000; Mol & Sonnenfeld 2000; Mol & Spaargaren 2000; Berger, et. al. 2001; Howes 2005). Overall the idea is to sell the 'win-win' scenario so that opposition to effective action is reduced.

The signs of a discursive change are mixed (Mercer and Marden 2006). While the Howard Government began to soften its resistance to setting emission targets and introducing a carbon trading system, it consistently framed the debate in terms of a 'jobs versus environment' trade-off and point blank refused to do anything that may harm the economic interests of the coal industry (Coorey 2007; Pearse 2009). Environment groups, researchers and renewable energy sector, however, have argued for the 'win-win' scenario where action on climate change can save industry money by reducing their energy bills and stimulate the renewable energy sector (Holmes, 2007; ACF & ACTU 2008; McNeil 2009). This concept was strongly supported by the Rudd regime in opposition, but in government the emphasis appears to have shifted to protecting the mining sector at the expense of deeper emission cuts. Community concern about climate change is high (Smith, 2007; Woolcott 2009) but the challenge is to translate this into an ongoing behavioural change. Australia's greenhouse emissions have been steadily rising and it remains one of the highest per

capita emitters in the world (Australian Bureau of Statistics 2007a; Mercer and Marden 2006). If we adopt a strong EM stance we would see a broader acceptance that reducing greenhouse gas emissions and fossil fuel use will be good for the economy, encouraging efficiency and shifting investment into new, cleaner growth industries.

## **Conclusions**

There are several points to make in conclusion. First, the science is telling us that Australia will face significant environmental, economic and social impacts from climate change. These impacts will be worse if the world does not reduce its greenhouse gas emissions dramatically and Australia must shoulder its share of the burden. Second, climate policy in Australia has gone through several phases, from naïve optimism, through an entrenched resistance, to policy frenzy and the current impasse. In all phases, however, government actions have been far more timid than what is needed, regardless of who is in power, and there is growing evidence that the fears of some powerful economic interests have successfully prevented more substantial change. Finally, if we reconstruct the problem using strong EM we would have a chance of overcoming this resistance and getting some more effective action under way. This would entail recasting the issue as an opportunity for a 'win-win' scenario, a meaningful policy re-engagement with community groups, a substantial restructuring of the decision making process to make it more transparent, a significant remodelling of the market to reward emission reductions, and a heavy investment in more eco-efficient technology.

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### References

- Althaus, C., P. Bridgman & G. Davis. 2007. *The Australian Policy Handbook*. 4<sup>th</sup> edn. Sydney: Allen & Unwin.
- Australian Broadcasting Commission (ABC). 2009. 'Carbon scheme vote put off until August.' ABC: Sydney. 25 June. URL: <a href="http://www.abc.net.au/news/stories/2009/06/25/2608273.htm">http://www.abc.net.au/news/stories/2009/06/25/2608273.htm</a>>. Consulted 14 July 2009.
- Australian Bureau of Statistics. 2007a. 'Greenhouse Gas Emissions and Climate Change' *Australian Year Book 2007*. Canberra: Australian Bureau of Statistics. URL:
  - <a href="mailto://www.abs.gov.au/AUSSTATS/abs@.nsf/bb8db737e2af84b8ca2571780015701e/727C6AF30EAA428DCA2572360006A829?opendocument">mailto://www.abs.gov.au/AUSSTATS/abs@.nsf/bb8db737e2af84b8ca2571780015701e/727C6AF30EAA428DCA2572360006A829?opendocument</a>. Consulted 16 July 2009.
- Australian Bureau of Statistics. 2007b. *Key National Indicators* 2007. Canberra: Australian Bureau of Statistics. URL:
  - <a href="http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/D5B5CF81909801FFCA2572A50016FEA7?OpenDocument">http://www.abs.gov.au/AUSSTATS/abs@.nsf/ProductsbyCatalogue/D5B5CF81909801FFCA2572A50016FEA7?OpenDocument</a>. Consulted 20 July 2009.
- Australian Government 2008. Climate Change Action Fund Investment. Canberra: Department of Climate Change. URL: <a href="http://www.climatechange.gov.au/whitepaper/factsheets/pubs/022-climate-change-action-fund-stream2-investment.pdf">http://www.climatechange.gov.au/whitepaper/factsheets/pubs/022-climate-change-action-fund-stream2-investment.pdf</a>>. Consulted 20 July 2009.
- Australian Government. 2009. *Australian 2020 Summit Government Response*. Canberra: Department of Prime Minister & Cabinet. URL: <a href="http://www.australia2020.gov.au/response/index.cfm">http://www.australia2020.gov.au/response/index.cfm</a>>. Consulted 1 September 2009.

- Australian Government, Department of Climate Change 2008. Carbon Pollution Reduction Scheme: Australia's Low Carbon Future. White Paper. Canberra. URL:
  - <a href="http://www.climatechange.gov.au/whitepaper/index.html">http://www.climatechange.gov.au/whitepaper/index.html</a>>. Consulted 23 July 2009.
- Australian Government, Department of Climate Change. 2009. The National greenhouse and Energy Reporting Act 2007. Canberra. URL:
  - <a href="http://www.climatechange.gov.au/reporting/legislation/act.html">http://www.climatechange.gov.au/reporting/legislation/act.html</a>>. Consulted 23 July 2009.
- Australian Government, The Treasury. 2008. *Australia's Low Pollution Future: The Economics of Climate Change Mitigation*. Canberra. URL: <a href="http://www.treasury.gov.au/lowpollutionfuture/">http://www.treasury.gov.au/lowpollutionfuture/</a>>. Consulted 23 July 2009.
- Australian Government. 2007. Australia's Climate Change Policy: our economy, our environment, our future. July. Canberra: Department of Prime Minister and Cabinet.
- Australian Labor Party (ALP). 2007. *National Climate Change Summit*. Australian Parliament House, Canberra: Australian Labor Party. 31 March. URL: <a href="http://climatesolutions.alp.org.au/panellists.php">http://climatesolutions.alp.org.au/panellists.php</a>>. Consulted 21 July 2009.
- Beck, U. 1992. Risk Society: Towards a New Modernity. London: Sage.
- Berger, G., A. Flynn, F. Hines, & R. Johns. 2001. 'Ecological Modernization as a Basis for Environmental Policy: Current Environmental Discourse and Policy and the Implications on Environmental Supply Chain Management.' *Innovation* 14(1): 55 72.
- Blowers, A. 1997. 'Environmental Policy: Ecological Modernisation or Risk Society?' *Urban Studies* 34 (5-6): 845 871.
- Brown, L. 2008. Plan B 3.0: Mobilizing to Save Civilisation. New York: Norton.
- Bulkeley, H. 2001. 'No regrets? Economy and environment in Australia's domestic climate change policy process.' *Global Environmental Change*: 155 169
- Bureau of Industry Economics (BIE). 1992. Research Report 42: Environmental Regulation: The Economics of Tradeable Permits A Survey of Theory and Practice. Canberra: AGPS.
- Business Council of Australia. 2008. *Modelling Success: Designing and ETS that Works*. BCA. URL: <a href="http://www.bca.com.au/Content/101485.aspx">http://www.bca.com.au/Content/101485.aspx</a>>. Consulted 23 July 2009.
- Buttel, F. 2000. 'Ecological Modernization as social theory.' Geoforum 31: 57 65
- Christoff, P. 2005. 'Policy Autism or Double-Edged Dismissiveness? Australia's climate policy under the Howard government.' *Global Change, Peace and Security* 17(1): 29 44
- Christoff, P. 1996. 'Ecological Modernisation, Ecological Modernities.' *Environmental Politics* **5**(3): 476 500.
- Climate Institute of Australia (CIA). 2009a. *Climate Impacts*. Sydney. URL: <a href="http://www.climateinstitute.org.au/index.php?option=com\_content&view=section&layout=blog&id=16&Itemid=14">http://www.climateinstitute.org.au/index.php?option=com\_content&view=section&layout=blog&id=16&Itemid=14</a>. Consulted 14 July 2009.
- Climate Institute of Australia. 2009b. *Clean Energy Jobs and Investment in Regional Australia*. Briefing Paper. URL: <a href="http://www.climateinstitute.org.au/images/maps/cleanenergyjobs.pdf">http://www.climateinstitute.org.au/images/maps/cleanenergyjobs.pdf</a>>. Consulted 23 July 2009.
- Cohen, J. 2006. 'The Greenhouse Mafia.' *Four Corners*. Sydney: ABC. URL: <a href="http://www.abc.net.au/4corners/content/2006/s1568867.htm">http://www.abc.net.au/4corners/content/2006/s1568867.htm</a>. Consulted 21 July 2009.
- Colitt, R. 2009. 'Global Climate Deal Still Possible: Brazil's Lula.' *Planet Ark.* 14 July. URL: <a href="http://www.planetark.com/enviro-news/item/53745">http://www.planetark.com/enviro-news/item/53745</a>. Consulted 14 July 2009.
- Commonwealth Scientific and Industrial Research Organisation (CSIRO). 2009. *Climate Change*. CSIRO Publishing. URL: < <a href="http://www.csiro.au/science/ClimateChange.html">http://www.csiro.au/science/ClimateChange.html</a>>. Consulted 14 July 2009.
- Coorey, P. 2007. 'PM hint on gas trading scheme.' *Sydney Morning Herald*.14 April. URL: <a href="http://www.smh.com.au/news/environment/pm-hint-on-gas-trading-scheme/2007/04/13/1175971356959.html?s\_cid=rss\_smh">http://www.smh.com.au/news/environment/pm-hint-on-gas-trading-scheme/2007/04/13/1175971356959.html?s\_cid=rss\_smh</a>. Consulted 21 July 2009.
- Curran, G. 2001. 'The Third Way and Ecological Modernisation.' *Contemporary Politics* **7**(1): 41 55.
- Daly, G. 2009a. 'Australia Opposition Split Over Rudd's Climate Plan.' *Bloomberg*. 21 July. URL: <a href="http://www.bloomberg.com/apps/news?pid=20601081&sid=awY1JU4jKUBk">http://www.bloomberg.com/apps/news?pid=20601081&sid=awY1JU4jKUBk</a>>. Consulted 24 July 2009.
- Daly, G. 2009b. 'Australia Approves Law to Boost Renewable Energy.' *Bloomberg*. 20 August. URL: <a href="http://www.bloomberg.com/apps/news?pid=20601081&sid=ajLhtH6Vnsoo">http://www.bloomberg.com/apps/news?pid=20601081&sid=ajLhtH6Vnsoo</a>>. Consulted 31 August 2009.
- Doyle, A. 2009a. 'G8 Makes Scant Progress to Copenhagen Pact.' *Planet Ark.* 10 July. URL: <a href="http://www.planetark.com/enviro-news/item/53705">http://www.planetark.com/enviro-news/item/53705</a>>. Consulted 14 July 2009.
- Doyle, A. 2009b. 'Tough Climate Goals Risk Huge Costs: Lomborg.' *Planet Ark.* 16 August. URL: <a href="http://www.planetark.com/enviro-news/item/54254">http://www.planetark.com/enviro-news/item/54254</a>. Consulted 16 August.

- Doyle, T. & A. Kellow. 1995. *Environmental Politics and Policy Making in Australia*. Melbourne: Macmillan.
- Doyle, T. & D. McEacherm. 2001. Environment and Politics. 2<sup>nd</sup> edn. London: Routledge.
- Dryzek, J. 1987. Rational Ecology: Environment and Political Economy., Oxford: Basil Blackwell.
- Dryzek, J. 1997. 1997. The Politics of the Earth: Environmental Discourse. Oxford: Oxford University Press.
- Dryzek, J., D. Downes, C. Hunold, & D. Schlosberg, with H-K. Hernes. 2003. *Green States and Social Movements: Environmentalism in the United States, United Kingdom, Germany and Norway*. Oxford: Oxford University Press.
- Eckersley, R. (ed.) 1995. Markets, the State and the Environment. Melbourne: Macmillan.
- ENVIROS Consulting. 2006. *Appraisal of Years 1-4 of the UK Emissions Trading Scheme*. London; Department of Environment, Food and Rural Affairs.
- Fisher, D. & W. Freudenburg. 2001. 'Ecological Modernisation and Its Critics: Assessing the Past and Looking Toward the Future.' *Society and Natural Resources* 14: 701-709.
- Garnaut, R. 2008. *Garnaut Climate Change Review Final Report*. Cambridge University Press. URL: <a href="http://www.garnautreview.org.au/index.htm">http://www.garnautreview.org.au/index.htm</a>>. Consulted 14 July 2009.
- Giddens, A. 2002. Where Now for New Labour? Cambridge: Polity Press.
- Giddens, A. 1998. The Third Way: The Renewal of Social Democracy. Polity Press: Cambridge.
- Gouldson, A. & J. Murphy. 1997. 'Ecological Modernization: Restructuring Industrial Economics.' In *Greening the Millennium? The New Politics of the Environment* ed M. Jacobs. Oxford: Blackwell Publishers.
- Hargroves, K. & M. Smith. (eds.) 2005. *The Natural Advantage of Nations: Business Opportunities, Innovation and Governance in the 21st Century*. London: Earthscan.
- Hajer, M. 1995. *The Politics of Environmental Discourse: Ecological Modernization and the Policy Process.* Oxford: Clarendon Press.
- Hennessy, K. C. Lucas, N. Nicholls, J. Bathols, R. Suppiah, J. Ricketts. 2005. *Climate change impacts on fire-weather in south-east Australia*. Victoria: Commonwealth CSIRO Marine and Atmospheric Research, Bushfire CRC and Australian Bureau of Meteorology. URL: <a href="http://www.cmar.csiro.au/e-print/open/hennessykj\_2005b.pdf">http://www.cmar.csiro.au/e-print/open/hennessykj\_2005b.pdf</a>. Consulted 16 July 2009.
- Howard, J. A. Downer, I. MacFarlaine & I. Campbell. 2006b. *Asia-Pacific Partnership Sets New Path to Address Climate Change*. Joint Press Release, January 12. Canberra: Office of Prime Minister.
- Howes, M. 2005. *Politics and the Environment: Risk and the role of government and industry*. Sydney: Allen & Unwin.
- Howes, M. 2008. "Rethinking Governance: Lessons in collaboration from environmental policy." *Australasian Political Studies Association Conference*, 6-9 July, University of Queensland, Hilton Hotel, Brisbane.
- Howes, M, M. McKenzie, B. Gleeson, R.Gray, J. Byrne, P. Daniels. 2009. *A preliminary assessment of the potential to adapt ecological modernisation to the Australian context*. Research Paper 23. Urban Research Program: Griffith University.
- Hutton, D. & L. Connors. 1999. *A History of the Australian Environment Movement*. Cambridge: Cambridge University Press.
- Holmes, J. 2007. 'Earth, Wind and Fire.' *Fours Corners*. Sydney: ABC. URL: <a href="http://www.abc.net.au/4corners/content/2007/s1898635.htm">http://www.abc.net.au/4corners/content/2007/s1898635.htm</a>. Consulted 21 July 2009.
- Independent Pricing and Regulatory Tribunal (IPART). 2008. Compliance and Operation of the NSW Greenhouse Gas Reduction Scheme During 2007: Report to Minister. Sydney: IPART.
- Intergovernmental Panel on Climate Change (IPCC). 2007. Fourth Assessment Reports. UN Publications. URL: <a href="http://www.ipcc.ch/">http://www.ipcc.ch/</a>>. Consulted 14 July 2009.
- Kent, A. & D. Mercer. 2006. 'Australia's mandatory renewable energy target (MRET): an assessment.' Energy Policy 34:1046–62
- Lundqvist, L. 2000. 'Capacity-building or social construction? Explaining Sweden's shift towards ecological modernisation.' *Geoforum* 31: 21 32.
- McGee, J. & R. Taplin. 2006. 'The Asia-Pacific Partnership of Clean Development and Climate: A Complement or Competitor to the Kyoto Protocol?' *Global Change, Peace & Security* 18(3): 173-92.
- McNeil, B. 2009. *The Clean Industrial Revolution: Growing Australian prosperity in a greenhouse Age*. Sydney: Allen & Unwin.
- Mercer D. & P. Marden. 2006. 'Ecologically Sustainable Development in a "Quarry" Economy: One Step Forward, Two Steps Back' *Geographical Research* June **44**(2): 183–203.

- Minerals Council of Australia (MCA). 2009. 'Carbon Pollution Reduction Scheme (CPRS) Senate should set scheme aside.' *Media Release*. 22 June. URL:

  <a href="http://www.minerals.org.au/">http://www.minerals.org.au/</a> data/assets/pdf file/0003/33996/MCA CPRS statement 21 June 2009.pdf>. Consulted 14 July 2009.
- Mol, A. 2000. 'The Environmental Movement in an era of Ecological Modernisation.' *Geoforum* 31: 45 56
- Mol, A & D. Sonnenfeld 2000. 'Ecological Modernisation Around the World: An Introduction.' *Environmental Politics* 9(1): 3 14.
- Mol, A. & G. Spaargaren. 2000. 'Ecological Modernisation.' Environmental Politics 9(1): 17-49.
- Paehlke, R. & D. Torgerson. (eds.) 1990. *Managing Leviathan: Environmental Politics and the Administrative State*. Belhaven Press: London.
- Pearse, G. 2009. 'Quarry Vision: Coal, climate change, and the end of the resources boom.' *Quarterly Essay*. 33: 1-122. URL: <a href="http://search.informit.com.au/fullText;dn=641806416011730;res=IELHSS">http://search.informit.com.au/fullText;dn=641806416011730;res=IELHSS</a>>. Consulted 21 August 2009.
- Pearse, G. 2007. *John Howard, Climate Change and the Selling of Australia's Future*. Sydney: Penguin.
- Pusey, M. 1991. *Economic Rationalism in Canberra: A Nation Building State Changes its Mind.* Sydney: Cambridge University Press.
- Queensland Government. 2008. 'Climate Change Project Funded.' *Press Release*. 26 May. URL: <a href="http://cms.jcu.edu.au/news/archive/JCUPRD\_032050">http://cms.jcu.edu.au/news/archive/JCUPRD\_032050</a>>. Consulted 31 August 2009.
- Riedy, C. & M. Diesendorf. 2003. 'Financial subsidies to the Australian fossil fuel industry.' *Energy Policy* 31:125-37.
- Rittel, H. & M. Webber. 1973. 'Dilemmas in a General Theory of Planning.' *Policy Sciences* 4: 155-67. URL:

  <a href="mailto:chitp://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General\_Theory\_of\_Planning.pdf">chitp://www.uctc.net/mwebber/Rittel+Webber+Dilemmas+General\_Theory\_of\_Planning.pdf</a>.

  Consulted 14 July 2009.
- Seippel, O. 2000. 'Ecological Modernization as a Theoretical Device: Strengths and Weaknesses.' *Journal of Environmental Policy and Planning* 2: 287-302
- Smith, T. 2007. 'Emerald city blacks out for a brighter future.' *Sydney Morning Herald*. April 1. URL: <a href="http://www.smh.com.au/news/environment/emerald-city-blacks-out/2007/03/31/1174761820887.html">http://www.smh.com.au/news/environment/emerald-city-blacks-out/2007/03/31/1174761820887.html</a>. Consulted 21 July 2009.
- Stern, N. 2006. *Stern Review on the Economics of Climate Change*. HM treasury/Cabinet Office: London. URL: <a href="http://www.hm-treasury.gov.uk/sternreview">http://www.hm-treasury.gov.uk/sternreview</a> index.htm</a>>. Consulted 14 July 2009.
- Taylor, R. 2009. 'Australian Parliament Rejects Carbon Trade Plan.' *Planet Ark*. August 13. URL: <a href="http://www.planetark.com/enviro-news/item/54222">http://www.planetark.com/enviro-news/item/54222</a>>. Consulted 17 August 2009.
- Taylor, L. 2009. 'Bill Split to Draw out Libs on ETS.' *The Australian*. 17 August. URL: <a href="http://www.theaustralian.news.com.au/story/0,25197,25938963-11949,00.html">http://www.theaustralian.news.com.au/story/0,25197,25938963-11949,00.html</a>>. Consulted 17 August, 2009.
- Toyne, P. 1994. *The Reluctant Nation: Environment, law and politics in Australia*. Sydney: ABC Books.
- United Nations (UN). 2005. Millennium Ecosystem Assessment Reports. UN Publications. URL: <a href="http://www.maweb.org/en/Index.aspx">http://www.maweb.org/en/Index.aspx</a>>. Consulted 14 July 2009.
- United Nations Environment Program (UNEP). 2007. *Global Environmental Outlook 4: Environment for Development*. UN Publications. URL: <a href="http://www.unep.org/geo/geo4/media/">http://www.unep.org/geo/geo4/media/</a>>. Consulted 14 July 2009.
- Von Malmborg, P. & F. Strachen. 2005. 'Climate Policy, Ecological Modernization and the UK Emission Trading Scheme.' *European Environment* 15: 143-60.
- Weale, A. 1998. 'The Politics of Ecological Modernization.' In *Debating the Earth: The Environmental Politics Reader*, eds J. Dryzek and D. Schlosberg. Oxford: Oxford University Press
- Wiener, J. 2004. 'Convergence, Divergence, and Complexity in US and European Risk Regulation.' In *Green Giants? Environmental Policies of the United States and the European Union.* N. Vig & M. Faure eds. Massachusetts: MIT Press.
- Welford, R. & P. Hills. 2004. 'Ecological Modernisation, environmental policy and innovation priorities for the Asia-Pacific Region.' *International Journal of Environment and Sustainable Development* 2(3): 324 340.
- Wong, P. 2009. *New Measures for the Carbon Pollution Reduction Scheme*. Media Release. Canberra: Minister for Climate Change and Water Office. URL:

- < http://www.environment.gov.au/minister/wong/2009/mr20090504.html >. Consulted 23 July 2009.
- Woolcott, I. 2009. 'Change the climate, say Australians, but not at any price.' *Crikey*. 26 August. URL: <a href="http://www.crikey.com.au/2009/08/26/change-the-climate-say-australians-but-not-at-any-price">http://www.crikey.com.au/2009/08/26/change-the-climate-say-australians-but-not-at-any-price</a>. Consulted 1 September 2009.
- World Commission on Environment and Development (WCED) 1987. *Our Common Future*. Oxford: Oxford University Press.
- York R, & E. Rosa. 2003. 'Key Challenges to Ecological Modernization Theory.' *Organisation and Environment* 16(3): 273 288.