

CLIMATE CHANGE MITIGATION AND ADAPTATION POLICY OPTIONS: REDUCING AUSTRALIA'S DEPENDENCE ON COAL, NATURAL GAS, AND OTHER NONRENEWABLE ENERGY RESOURCES

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I. INTRODUCTION

The global financial crisis (GFC) adversely affected some of the world's strongest economies with many of them slipping into negative growth. However, Australia not only experienced positive economic growth, but also maintained a rate above the average growth rate of other members of the Organization of Economic Cooperation and Development (OECD).¹ Australia's Gross Domestic Product (GDP), an important indicator of economic growth, has steadily increased since 2005.² Several reasons have been put forward to explain why Australia has remained largely unscathed by the GFC. According to the Australian government, timely policy interventions that provided economic stimulus to vulnerable sectors of its economy played an important role in protecting Australia's economy from the negative effects of the GFC. As policy responses, the government provided support through direct government investments, developed a financial credit scheme for purposes of funding guarantees of deposits held, and increased supervision in the financial sector.³ All of these measures helped maintain financial confidence, which explains why, despite the international turmoil, banks in Australia have not only

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1. *Australia in Brief: A Stable and Competitive Economy*, AUSTRALIAN GOVERNMENT DEPARTMENT OF FOREIGN AFFAIRS & TRADE, June 2008, available at http://www.dfat.gov.au/aib/competitive_economy.html. [hereinafter *Australia in Brief*]. Twenty countries originally signed the Convention on the Organization for Economic Co-operation and Development (OECD) on December 14, 1960. Subsequently, thirteen additional countries have ratified the convention. *List of OECD Member countries - Ratification of the Convention on the OECD*, http://www.oecd.org/document/58/0,3343,en_2649_201185_1889402_1_1_1_1,0.html (last visited Apr. 9, 2011).

2. *Indicators: GDP Growth (annual %)*, WORLD BANK, <http://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG> (last visited Apr. 9, 2011).

3. *Australia: 2009 Article IV Consultation-Staff Report; and Public Information Notice on the Executive Board Discussion*, IMF COUNTRY REPORT NO. 09/268 (Aug., 2009).

maintained access to capital funding, but have experienced strong growth in deposits.⁴

Additionally, the Australian Prudential Regulation Authority (APRA) provided robust oversight of the financial services industry in Australia. Since its establishment in 1998, the APRA has played a significant role in ensuring that the Australian investment banking sector has had minimal exposure to similar types of sub-prime securities that were at the heart of the credit crisis in the United States and elsewhere.

More important than the structural reforms and timely government interventions, Australia survived the crisis due to a lengthy period of sustained economic growth prior to the GFC. The government's sustained budget surplus facilitated the elimination of Australia's net government debt by the 2005–2006 financial year.⁵ Prior to the GFC, the healthy state of Australia's economy ensured that the government had the resources to respond, which in many cases involved direct investments. However, the government's 2008–2009 budget indicated that the surpluses had ended. The Australian government's net debt is expected to peak at 6% of GDP in 2011–12.⁶ In 2009, the treasurer forecasted that Australia's net debt would peak at 13.8% of GDP in 2014. However, the current strength of Australia's GFC recovery suggests that budget surpluses may return earlier than forecasted.⁷ The budget deficit was blamed on the economic downturn in China,⁸ which highlights Australia's dependency on China and offers insight into Australia's sterling economic performance over the last few years.

Coal plays an important role in the Australian economy. Australia is the world's largest coal exporter. Its 2008 net exports account for approximately thirty-two percent of the world's total coal exports.⁹ Coal is ranked first among the country's exported goods and services, accounting for A\$39.2 billion in revenue in 2009. Australia's other major exports include minerals, such as iron ore, aluminum, and gold, and other sources of energy, such as crude petroleum and natural gas.¹⁰ Thus, Australia's export trade is largely dependent on minerals and nonrenewable energy

4. Patrizia Tumbarello, *Australian, New Zealand Banks Remain Sound During Global Crisis*, IMF SURV. MAG.: COUNTRIES & REGIONS, Jan. 22, 2010.

5. *Australia in Brief*, *supra* note 1.

6. *Overview: Australian Government Budget 2010-2011*, AUSTRALIAN GOVERNMENT, http://www.budget.gov.au/2010-11/content/economic_statement/html/economic_statement-02.htm (last visited Apr. 9, 2011).

7. Budget Speech 2009–10 on the Second Reading of the Appropriation Bill (No.1) by Wayne Swan, Treasurer, Commonwealth of Australia, (May 12, 2009).

8. *Defending Australia from the Financial Crisis?*, CSDS, available at <http://cpds.apana.org.au/Teams/Articles/Fortress.htm> (last visited Apr. 11, 2011).

9. INT'L ENERGY AGENCY, KEY WORLD ENERGY STATISTICS, (2009) available at http://www.iea.org/textbase/nppdf/free/2009/key_stats_2009.pdf.

10. *Id.*

sources. China is currently Australia's largest export market. Minerals and fuels account for more than sixty percent of Australia's total merchandise exports to China.¹¹ The three largest importers of Australian coal are Japan, Korea, and China.¹² This relationship is likely to continue because of increasing demand for energy, as evidenced by the recent US\$60 billion contract between China Power International Development (CPI) and an Australian mining company, Resourcehouse.¹³ This increased demand for coal and other nonrenewable sources of energy has also contributed to the health of Australia's economy.

Nonrenewable fuels are also an important source of energy within Australia. Most of the nation's energy is generated from nonrenewable fuels including oil, natural gas, and coal.¹⁴ For instance, over ninety-six percent of the fuel used to generate electricity in 2006 and 2007 was nonrenewable.¹⁵ Coal contributes to the provision of electricity to consumers and industry at a relatively cheap cost, making it internationally competitive.¹⁶ Nonrenewable fossil fuels provide employment opportunities for a significant number of Australians, particularly rural Australians. By 2007, about 117,500 people were working in mines, not including the significant number of people indirectly employed by the mining industry.¹⁷

The importance of coal and other fossil fuels to the Australian economy explains the current political focus on carbon emission reduction and helps contextualize the current debate regarding the Emissions Trading Scheme (ETS) proposed by Kevin Rudd's Labor Government. Australia's heavy reliance on nonrenewable sources of energy poses a threat to the environment and raises sustainability concerns. Apart from imprudent exploitation possibly depleting these exhaustible resources, fossil fuels also contain carbon and contribute to carbon emissions when consumed. Carbon emissions have been shown to contribute to the greenhouse gas effect. Notwithstanding the current scientific controversy surrounding the possible

11. *Trade and Investment*, AUSTRALIAN EMBASSY, CHINA, <http://www.china.embassy.gov.au/bjng/relations2.html> (last visited Apr. 11, 2011).

12. *SMH: King Coal Will Be Dethroned, and BJP Should Align Itself with Carbon Revolt*, BEYOND ZERO EMISSIONS, <http://beyondzeroemissions.org/media/newswire/smh-king-coal-will-be-dethroned-and-bhp-should-align-itself-carbon-revolt-110127> (last visited Apr. 10, 2011).

13. Amy Coopes, *Australia's Resourcehouse Signs China Coal Deal*, AFP, Feb. 5, 2010.

14. *Australia's Environment: Issues and Trends, Jan. 2010*, AUSTL. BUREAU STAT. (Feb. 5, 2010), available at <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Lookup/4613.0Chapter30Jan+2010>.

15. *Id.*

16. *The Australian Coal Industry*, AUSTL. COAL ASS'N, <http://www.australiancoal.com.au/the-australian-coal-industry.aspx> (last visited Apr. 20, 2011).

17. *Mining Operations Australia 2006-07*, AUSTL. BUREAU OF STAT., (2008).

effect of these emissions on the earth's climate and the magnitude of such climate change,¹⁸ the negative effect of carbon emissions into the atmosphere is not in dispute.¹⁹ Thus, the need for climate change mitigation continues to be a policy priority for the Australian government.

The current government has failed to pass its much-touted Carbon Pollution Reduction Scheme (CPRS)²⁰ after two valiant attempts. This highlights Australia's dilemma in its quest to reduce dependence on fossil fuels, while the country faces a restructuring of its industrial and mining sectors that are themselves subject to increasing demand for their nonrenewable and carbon intensive resources. Australia is not alone in this quagmire. For countries around the world, the collapse of recent climate negotiations in Copenhagen and the international community's failure to reach a meaningful agreement with fixed and verifiable targets for carbon emission have significantly undermined public support to combat climate change.

The recent serious allegations and admissions impugning the integrity of the United Nations' Intergovernmental Panel on Climate Change (IPCC) undermined the scientific consensus that had, after many years, finally managed to penetrate the conscience of the global commons.²¹ The unfortunate convergence of the global financial crisis robbed the international community of the momentum to take immediate action and placed efforts to mitigate global warming in a holding pattern.

This article explores the role of industry in enabling Australia to move toward a less carbon intensive economy. It then examines how technological innovation and the adoption of appropriate adaptive strategies will ensure that this country's economy is firmly on the path to a sustainable future.

18. Olive Heffernan, *Climategate Scientist Speaks Out*, NATURE.COM (2010), <http://www.nature.com/news/2010/012345/full/news.2010.71.html>.

19. Quirin Schiermeier, *The Real Holes in Climate Science*, 463 NATURE 284 (2010), available at <http://www.nature.com/news/2010/100120/pdf/463284a.pdf>

20. Carbon Pollution Reduction Scheme Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (Consequential Amendments) Bill 2009 (Cth) (Austl.); Australian Climate Change Regulatory Authority Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (Charges - General) Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (Charges - Customs) Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (Charges - Excise) Bill 2009 (Cth) (Austl.); Customs Tariff Amendment (Carbon Pollution Reduction Scheme) Bill 2009 (Cth) (Austl.); Excise Tariff Amendment (Carbon Pollution Reduction Scheme) Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (CPRS Fuel Credits) Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme (CPRS Fuel Credits) (Consequential Amendments) Bill 2009 (Cth) (Austl.); Carbon Pollution Reduction Scheme Amendment (Household Assistance) Bill 2009 (Cth) (Austl.).

21. *Climategate & IPCC Scandals Undermine Public Trust in Science*, ASSOCIATED PRESS, Mar. 4, 2011, available at <http://www.thegwpf.org/science-news/612-climategate-scandal-undermines-public-trust-in-science.html>. [hereinafter *Climategate*].

II. POST COPENHAGEN AND CLIMATE CHANGE MITIGATION: AN ABANDONED AGENDA?

Mitigation of climate change caused by human activities, and particularly by greenhouse gas (GHG) emissions, has been a concern for more than a decade. However, this is one of the areas of international environmental governance where consensus has proved difficult to achieve as evidenced by the very first attempt, the United Nations Framework Convention on Climate Change (UNFCCC).²² The UNFCCC, adopted in 1992 and enforced in 1994, constituted a framework in which countries recognized the adverse effect of GHG emissions and voluntarily pledged to reduce them. The passage of time required a second phase in order to elaborate and concretize the measures that governments would be required to take to reduce GHG emissions. The Kyoto Protocol,²³ adopted by the third Conference of Parties (COP 3), set quantitative targets for reduction of GHG emissions between 2008 and 2012 for Annex I (Developed) countries.²⁴

In the recent past, two events have seriously threatened the future of global climate change mitigation: the Climate Change Conference at Copenhagen and the allegations against the IPCC. First, the Climate Change Conference in December 2009 failed to produce its expected output, which was a legally binding instrument to govern climate change for the post-2012 period. Second, the recent allegations and accusations made against the IPCC jeopardized not only the credibility of the leading scientific body in the assessment of climate change, but also the very science behind climate change.²⁵

Deeper analysis highlights the fallacy of abandoning human-induced climate change mitigation efforts. At first glance, the Copenhagen Conference may appear to have been a total collapse as the accord,²⁶ produced after hurried political negotiations between a few countries, was not exactly the expected legally binding successor to the Kyoto Protocol. When the Bali Action Plan²⁷ established the Ad Hoc Working Group on

22. *U.N. Framework Convention on Climate Change*, 1771 U.N.T.S. 107, (1992).

23. *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, 37 I.L.M. 22 (1997) [hereinafter *Kyoto Protocol*].

24. GLOBAL WARMING: LOOKING BEYOND KYOTO; ERNESTO ZEDILLO ED. CENTRE FOR THE STUDY OF GLOBALIZATION, Yale University (Brookings Institution Press, 2008) at p.2.

25. See *infra*, note 45.

26. *Draft Decision: Copenhagen Accord*, United Nations Climate Change Copenhagen Conference, Copenhagen, Den., Dec. 7–18, 2009, -/Cp. 15, U.N. Doc. FCCC/CP/2009/L.7 (Dec. 18, 2009), <http://unfccc.int/resource/docs/2009/cop15/eng/107.pdf> [hereinafter *Copenhagen Accord*].

27. *Bali Action Plan Decision*, United Nations Framework Convention on Climate Change: Conference of the Parties, Bali, Indon., Dec. 3–7, 2007, 1/Cp.13, U.N. Doc. FCCC/CP/2007/6/Add.1, (Mar. 14, 2008).

Long Term Cooperative Action (AWG-LCA) under the UNFCCC, its intended mandate was to develop a comprehensive outcome. The AWG-LCA was to achieve cooperation in the areas of mitigation, adaptation, finance, and technology, with the deadline of COP₁₅ in Copenhagen.²⁸ However, from the onset, there was lack of clarity as to the accord's intended outcome. There was the question of whether the establishment of a second track negotiation meant that there were to be two separate outcomes: 1) one under the AWG-LCA and another under the Ad Hoc Working Group on Further Commitments for Annex I parties under the Kyoto Protocol (AWG-KP), or 2) a single outcome integrating both negotiation processes. Also, there was no clear agreement that the outcome of the accord would be legally binding.²⁹ Thus, it was not a surprise that the Copenhagen Conference was characterized by disagreements in the course of negotiation and that it resulted in a largely political agreement with no clear targets instead of a legally binding instrument.

The Copenhagen Accord may not have met the high and arguably unreasonable expectations that were placed on it. However, it demonstrated the parties' commitments to cap global temperature rise by significantly reducing emissions and to raise money for mitigation efforts in developing countries.³⁰ The accord is founded on the scientific view of the need to ensure that the global temperature increase is less than two degrees Celsius in order to mitigate the adverse effects of anthropogenic global climate change.³¹ Consequently, climate change mitigation remains a key policy objective for a large number of countries.

The recently revealed flaws in the methodology and operation of the IPCC and the Climatic Research Unit (CRU) at the University of East Anglia, particularly in the context of its peer review processes, have been used by the media and climate change skeptics to question scientific consensus regarding the effects of anthropogenic climate change. For example, in 2007, the IPCC stated in a comprehensive report that that the Himalayan Glaciers would completely melt by 2035.³² The IPCC has come under harsh criticism over this statement. That one of the lead authors of the report was among those questioning the accuracy of the assertion did

28. *Id.* at 5.

29. Daniel Bodansky, *The Copenhagen Climate Change Conference: A Post-Mortem*, 104 AM. J. INT'L L. 230, 238 (2010).

30. *Copenhagen United Nations Climate Change Conference Ends with Political Agreement to Cap Temperature Rise, Reduce Emissions and Raise Finance*, U.N. FRAMEWORK CONVENTION ON CLIMATE CHANGE-SECRETARIAT, U.N. Press Release (Dec. 19, 2009).

31. *Copenhagen Accord*, *supra* note 33, at art. 2.

32. R.V. Cruz et al., *Asia in Climate Change 2007: Impacts, Adaptations and Vulnerability*, in CONTRIBUTION OF WORKING GROUP II TO THE FOURTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 469, (M.L. Parry et al. eds., 2007).

not help.³³ The IPCC's recent admission of the statement's inaccuracy and its published public apology³⁴ have only fueled further media attacks on the IPCC. Climate change skeptics have capitalized on the situation and are now questioning the entire science behind anthropogenic climate change suggesting that it has become a "dead issue."³⁵ These disturbing revelations have led the head of the CRU, Professor Phil Jones, to agree to stand down pending the outcome of a full investigation of the theft of sensitive e-mails.³⁶ Additionally, Ivo de Boer, United Nations' Executive Secretary of the UNFCCC, resigned effective July 2010, and intense pressure is being placed on Rajendra Pachauri, chair of the IPCC, to follow suit.³⁷ The threat to the credibility of the science behind climate change has exacerbated the already bleak prospect presented by the Copenhagen conference. The result is a loss of momentum in the adoption of policies to mitigate human induced climate change.

Though members of the IPCC and the CRU conceded that there may have been a failure to adopt best practices in some of their research projects,³⁸ this does not justify the condemnation of the scientific findings of the various research projects on climate change over the years. The errors committed revealed the need to reconsider the processes of the IPCC to ensure best practices are followed.³⁹ Besides adherence to best practices, scientific advances are helping scientists understand the complexity of factors involved in explaining the variability of the earth's climate systems and the uncertainties prevalent in determining the future effects of carbon emissions.⁴⁰ However, the effects of climate change on the environment and society will ultimately depend on "how humankind responds through

33. Quirin Schiermeier, *Glacier Estimate is on Thin Ice*, 463 NATURE 276 (2010).

34. *Intergovernmental Panel on Climate Change, IPCC Statement on the Melting of the Himalayan Glaciers*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (Jan. 20, 2010), available at <http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf>.

35. Roger L. Simon, *Post Copenhagen: Is Man-Made Global Warming a Dead Issue?*, PAJAMAS MEDIA (Dec. 22, 2009), available at <http://pajamasmedia.com/rogerlsimon/2009/12/22/post-copenhagen-is-man-made-global-warming-a-dead-issue/>.

36. Climategate, *supra* note 27.

37. Ben Webster, *IPCC Chairman Rajendra Pachauri Under Pressure To Go Over Glacier Error*, TIMES (Feb. 4, 2010), <http://www.timesonline.co.uk/tol/news/environment/article7014203.ece>.

38. Heffernan, *supra* note 20.

39. On March 10, 2010, the Secretary-General of the United Nations and the Chair of the IPCC announced an independent review by the InterAcademy Council (IAC) of the IPCC's processes and procedures to further strengthen the IPCC's reports on climate change. See *Scientific Academy to Conduct Independent Review of IPCC's Processes and Procedures at Request of United Nations and IPCC*, INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, (Mar. 10, 2010), available at <http://www.ipcc.ch/pdf/press/pr-1003210-UN.pdf>.

40. Richard H. Moss et al., *The Next Generation of Scenarios for Climate Change Research and Assessment*, 463 NATURE 747 (2010).

changes in technology, economies, lifestyle, and policy.”⁴¹

Overall, the science has not changed; anthropogenic activities affect the earth’s climate systems though the extent and magnitude of this effect on future climatic systems is uncertain. However, as a precautionary principle, governments must adopt policies that will help ensure that the adverse effects of these activities are moderated as scientists further investigate them.

III. AUSTRALIA’S CLIMATE CHANGE MITIGATION EFFORTS

Despite exporting the largest amount of coal in the world, Australia is not the highest emitter of carbon. Outranked by China, the United States, Russia, and India among others, Australia contributes only 1.4% of global emissions.⁴² This low rate does not necessarily mean that Australia is not a major source of emissions. Despite Australia’s large physical size, it has a relatively small population compared to these other countries. Thus, Australia’s total emissions are likely to be low despite high reliance on fossil fuels. Nevertheless, according to a recent report, Australia is ranked as the world’s highest carbon dioxide emitter per capita.⁴³

Globally, Australia’s carbon emission rate is relatively low due to the accounting rules established by the Kyoto Protocol. Under these rules, emissions from fossil fuels such as coal and natural gas (including sequestered carbon in trees and other vegetation) count toward a country’s total emissions only if they are burned or decomposed in that country.⁴⁴ This means that carbon emissions from Australia’s coal and natural gas exports are credited to the country in which they are burned or decomposed, as opposed to the country of origin. China, whose largest coal supplier is Australia, ranked first among the 2007 list of countries with the highest carbon emissions.⁴⁵ This implies a connection between China’s high carbon emissions and Australia’s coal, though the current Kyoto Protocol accounting rules prevent establishing a direct link.

Australia’s total fossil fuel emissions have increased in the last few years. Between 2004 and 2005 there was a 7.4% increase in total carbon

41. *Id.*

42. *Top 20 Emitting Countries by Total Fossil-Fuel CO2 Emissions for 2007*, CARBON DIOXIDE INFO. ANALYSIS CENTER, http://cdiac.ornl.gov/trends/emis/tre_tp20.html (last visited Apr. 11, 2011) [hereinafter *Top 20*].

43. *Australia Overtakes USA as Top Polluter, Reveals Maplecroft CO2 Emissions from Energy Index*, MAPLECROFT (Sept. 9, 2009), http://www.maplecroft.com/about/news/australia_overtakes_usa_as_top_polluter_09.html (last visited Apr. 11, 2011).

44. <http://www.aph.gov.au/library/pubs/bn/sci/KyotoAccRules.htm> (last visited 11 Feb 2011)

45. *Top 20*, *supra* note 50.

dioxide emissions.⁴⁶ By 2006, Australia's carbon dioxide emissions rose to 101 million metric tons.⁴⁷ Emissions from coal consumption accounted for nearly fifty-seven percent of the 2006 total fossil fuel emissions, which indicates Australia's economic dependency on coal.⁴⁸ Natural gas is also a major source of carbon emissions in Australia accounting for fourteen percent of the 2006 carbon dioxide emissions.⁴⁹ Cognizant of its increasing GHG emissions, Australia has sought ways to reduce its carbon dioxide release.

The high ratings in both total GHG emissions and per capita emissions, as well as the increasing rate of total GHG emissions in Australia, has increased pressure on the government to implement emission reduction. Further, Australia's current government seems to be convinced of a need to provide international moral leadership in the adoption of policies to combat climate change.⁵⁰

Debate over the direction of Australia's climate change policy has brought the delicate balance between environmental protection and economic considerations to the forefront. The initial debate surrounding the housing of climate change policy issues, either in the Ministry of Environment or the Ministry of Energy, demonstrated the difficulty of balancing these apparently conflicting interests. The Ministry of Environment identified climate change as an environmental issue and, thus, within its mandate. The Department of Energy argued that given how central exports of coal, natural gas, and uranium are to the Australian economy, the issue of GHG emissions reduction was better placed in its ministry, which would adopt strategies focused on energy systems.⁵¹ Eventually, the matter was settled when the Labor government, then in power, decided to implement only mitigation measures that would not have net adverse economic impacts both nationally and on Australia's trade competitiveness in the absence of similar action by major greenhouse gas producing countries.⁵²

To ensure the protection of Australia's economy, industry must be

46. Tom Boden et al., *National CO₂ Emissions from Fossil Fuel Burning, Cement Manufacture, and Gas Flaring: 1751-2007*, CARBON DIOXIDE INFO.ANALYSIS CENTER (June 8, 2010), available at <http://cdiac.ornl.gov/ftp/trends/emissions/aus.dat>.

47. *Id.*

48. *Id.*

49. *Id.*

50. Wayne Swan & Penny Wong *Foreword to AUSTL., AUSTRALIA'S LOW POLLUTION FUTURE: THE ECONOMICS OF CLIMATE CHANGE MITIGATION* at iv (2008), available at http://www.treasury.gov.au/lowpollutionfuture/summary/downloads/Australias_Low_Pollution_Future_Summary.pdf.

51. Michael I. Jeffery, *Beyond Kyoto: Climate Change Including a Discussion of the AP6 Initiative from the Australian Perspective*, in *CRUCIAL ISSUES IN CLIMATE CHANGE AND THE KYOTO PROTOCOL: ASIA AND THE WORLD* 505 (Kheng-Lian Koh et al. eds., 2010).

52. *Id.* at 507.

included when determining the direction of climate change policy. The Australian Business Roundtable on Climate Change Group was formed to help understand the business risks associated with climate change and to participate in the development of policy frameworks and marketing conditions for a low carbon future.⁵³ The group included six of Australia's largest corporations.⁵⁴ Their recommendations, contained in the report *Business Case for Early Action*, reiterated the caution expressed by both political sides that Australia should adopt policies referent to international action so as not to reduce the competitiveness of the nation's products.⁵⁵

In keeping with this recommendation, the Australian government sought to enter strategic regional alliances with other major producers and consumers of coal and other fossil fuels. The Asia Pacific Partnership on Clean Development and Climate (AP6) was one such multilateral and multi-stakeholder alliance also initiated by the former John Howard government. The AP6 brings together some of the world's largest stakeholders in carbon and fossil fuel industries: the United States, China, India, Japan, South Korea, and Australia.⁵⁶ The objective of the AP6 is to establish a forum in which these countries work together alongside the private sector to "meet goals for energy security, national air pollution reduction, and climate change in ways that promote sustainable economic growth and poverty reduction."⁵⁷ The AP6 initiative intends to build on the already existing multilateral climate initiatives, which involve initiatives for developing renewable energy technologies, energy efficient technologies, and market mechanisms to reduce GHG emissions.⁵⁸

The AP6 was also regarded as a possible alternative framework for negotiating the post-2012 climate change commitments.⁵⁹ Former U.S. President George W. Bush proposed that the major developed and developing countries come together to forge a post-2012 agreement on

53. *The Business Case for Early Action*, AUSTL. BUS. ROUNDTABLE ON CLIMATE CHANGE, THE BUSINESS CASE FOR EARLY ACTION, (April 2006), available at <http://www.businessroundtable.com.au/pdf/F078-RT-WS.pdf>.

54. *Id.* The members include BP Australia, Insurance Australia Group, Origin Energy, Swiss Re, Visy Industries, and Westpac, which joined with the Australian Conservation Foundation. *Id.*

55. *Australian Business Roundtable on Climate Change*, ORIGIN, <http://www.originenergy.com.au/1825/Business-roundtable> (last visited Dec. 27, 2010).

56. *About the Asia-Pacific Partnership*, AUSTL. GOV'T DEP'T ENERGY, RESOURCES, & TOURISM, <http://www.ret.gov.au/Documents/app/about.html> (last visited Apr. 11, 2011).

57. ASIA PAC. PARTNERSHIP ON CLEAN DEV. & CLIMATE, <http://www.asiapacificpartnership.org/english/default.aspx> (last visited Apr. 10, 2011).

58. Peter Lawrence, *The Asia Pacific Partnership on Clean Development and Climate (AP6): A Distraction to the Kyoto Process or a Viable Alternative?*, 10 ASIA PAC. J. ENVTL. L. 1 (2007).

59. *Id.*

GHG emissions.⁶⁰ This proposal seems to have been the preferred option of President Barack Obama at the 2009 Copenhagen Summit.⁶¹ The Copenhagen Accord was the result of negotiations among the world's large stakeholders in coal and fossil fuel trade. However, Australia was absent from the negotiations that altered climate change strategies, which followed the change in government in both Australia and the United States prior to the Copenhagen Summit.⁶²

A. Australia's Carbon Pollution Reduction Scheme: Doomed to Fail?

In December 2007, Kevin Rudd was sworn in as the twenty-sixth Australian Prime Minister. Among the policy goals in his electoral campaign package was to ratify the Kyoto Protocol, create a national carbon trading scheme by 2010, set a carbon emission reduction target of sixty percent by 2050, provide A\$500 million to fund development of clean coal technology, and promote other impressive policies on environmental protection.⁶³ Since the change in government, Australia has ratified the Kyoto Protocol and introduced CPRS legislation, which has created an emissions reduction scheme utilizing a cap and trade mechanism.⁶⁴

The current government's CPRS is arguably an attempt to implement the recommendations of Australia's most comprehensive government enquiry into climate change: the Garnaut Review. In 2007, Professor Ross Garnaut was commissioned by the Commonwealth and the State and Territory governments of the Australian Federation to examine the effects of climate change on Australia and recommend a policy framework to ensure sustainability.⁶⁵ In September 2008, Garnaut presented his final

60. See Anita Talberg, *The Kyoto Protocol Accounting Rules*, SCIENCE, TECHNOLOGY, ENVIRONMENT AND RESOURCES SECTION, available at <http://www.aph.gov.au/library/pubs/bn/sci/KyotoAccRules.htm> (last visited Apr. 11, 2011).

61. See *President Obama's Address at the Copenhagen Summit*, HUFFINGTON POST, Mar. 18, 2010, available at http://www.huffingtonpost.com/2009/12/18/obama-in-copenhagen-speech_n_396836.html.

62. See commentary Hugh Bartling, Associate Professor of Public Policy at DePaul University, Chicago, <http://hughbartling.com/?cat=10> (last visited Apr. 10, 2011).

63. N.S.W. BUS. CHAMBER, THE RUDD GOVERNMENT: OVERVIEW OF BUSINESS POLICIES (Nov. 2007), available at http://www.nswbusinesschamber.com.au/reference/influence_government/REP_1450_New_Govt_Policies_for_Business.pdf.

64. First introduced to Parliament on May 14, 2009; for an outline of CPRS history see CPRS history, AUSTL. GOV'T DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, <http://climatechange.gov.au/en/government/initiatives/cprs/cprs-progress.aspx> [hereinafter CPRS history] (last visited Apr. 10, 2011).

65. ROSS GARNAUT, THE GARNAUT CLIMATE CHANGE REVIEW: FINAL REPORT xii (2008) available at <http://www.garnautreview.org.au/index.htm>.

report.⁶⁶ Garnaut found that the rate of Australia's GHG emissions was increasing and that there is need to reduce these emissions to prevent the possible adverse effects of climate change.⁶⁷ One of the main findings of the review, and perhaps the most controversial, was its proposal that Australia's climate change response be built around obtaining an international consensus on stabilizing the concentration of atmospheric greenhouse gases at 550 parts per million (ppm) of carbon dioxide equivalents (CO₂-e).⁶⁸ The report proposed that Australia's climate change policy focus on a carbon pollution reduction scheme with two options for reduction targets based on the possible outcomes of the global negotiations for a legally binding agreement. If an international binding agreement was reached in which other major emitters committed to significant reductions, then Australia ought to adopt a target of ten percent reduction by 2020 and an eighty percent reduction by 2050.⁶⁹ On the other hand, if the global community did not agree on a legally binding agreement, then Australia ought to set reduction targets at five percent by 2020 and sixty percent by 2050.⁷⁰ Apart from the CPRS, the report also advocated complementary measures involving a broad mix of adaptation policy options including flexible markets, information, and direct assistance.⁷¹

After the release of the Garnaut Review's final report, the government proposed a set of laws to implement an ETS. Under the CPRS, the government would set an annual cap on the amount of carbon pollution Australia may emit. The government would then gradually reduce this cap to help the country meet its reduction targets for 2020.⁷² The national target would be between five percent and fifteen percent below year 2000 levels by the year 2020.⁷³ Companies and groups operating within Australia that emit carbon would need permits that could be issued or purchased to allow such emissions. The total number of permits issued would have to be within the government cap. Businesses could trade permits if they find they have less need for them than required or more than anticipated.⁷⁴ This

66. Andrew Macintosh, *The Garnaut Review's Targets and Trajectories: A Critique*, 26 ENVTL. & PLAN. L. J. 88 (2009) available at http://law.anu.edu.au/CCLP/WP4_2008_Garnaut_critique.pdf.

67. GARNAUT, *supra* note 74.

68. Macintosh, *supra* note 75.

69. GARNAUT, *supra* note 74, at xxx.

70. *Id.*

71. *Id.*

72. *Carbon Pollution Reduction Scheme*, AUSTL. GOV'T DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, <http://www.climatechange.gov.au/government/initiatives/cprs.aspx> (last updated May 7, 2010).

73. *National Targets*, AUSTL. GOV'T DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, <http://www.climatechange.gov.au/government/reduce/national-targets.aspx> (last updated Nov. 29, 2010).

74. *Carbon Pollution Reduction Scheme*, *supra* note 81.

trading scheme is intended to reduce GHG emissions at the lowest cost.

The Coalition, the Greens, and two independent Senators vociferously opposed attempts by the current government to enact the CPRS. The CPRS bill was first introduced into Parliament in May 2009 and rejected by the Senate in August 2009.⁷⁵ A second attempt to reintroduce the bill was made in October 2009 and contained amendments agreed to by Malcolm Turnbull, the former Leader of the Coalition, but without the endorsement of his Party Room. However, just before the Copenhagen Conference, the Senate also rejected the reintroduced bill in December 2009.⁷⁶ This divisive issue within the Coalition opposition party triggered a leadership spill resulting in the surprise election of a new Leader, Tony Abbott.⁷⁷ The Labor Government, apparently undaunted by the depth of the opposition to the CPRS, reintroduced the bill into Parliament in February 2010 for the third time. But it was withdrawn by the Rudd government in April 2010 when he announced that implementation of a CPRS in Australia would be delayed until 2013 at the earliest.⁷⁸

The Greens, the Coalition, and the two independent Senators have faulted the CPRS on many grounds. Perhaps the most wide sweeping criticism directed at the CPRS has been its alleged complexity, which has contributed to its lack of popularity.⁷⁹ Specifically, the Greens consider the proposed target of five percent unambitious and instead propose twenty-five to forty percent reductions below 2000 levels of GHG emissions by 2020.⁸⁰

The Coalition government opposed the CPRS on grounds that it failed to meet the least cost test.⁸¹ Whereas the Coalition agrees with the Labor government's target to reduce the GHG emissions by five percent by 2020, it argues that this can be achieved using their direct action plan, which is more cost effective than the CPRS.⁸² The Coalition plan radically departs from the current government policy approach because it is based on direct

75. *Supra* note 70.

76. *Id.*

77. Tony Abbot won the leadership of the Coalition Opposition party by a single vote on December 1, 2009. See Lincoln Archer, *Liberal Leadership Spill: Tony Abbott Wins*, NEWS.COM.AU (Dec. 1, 2009), available at <http://www.news.com.au/national/liberal-leadership-spill-tony-abbott-wins/story-e6frfkvr-1225805630744>.

78. CPRS history, *supra* note 70.

79. Richard Denis, *Time for a Breath of Fresh Air*, THE CANBERRA TIMES, Apr. 24, 2010.

80. THE GREENS, AUSTRALIAN GREENS POLICY: CLIMATE CHANGE AND ENERGY, para. 15 (Nov. 2009), available at <http://greens.org.au/sites/greens.org.au/files/C1%20Climate%20Change%20Nov%202009.pdf>.

81. THE COAL. PARTY AUSTL., THE COALITION'S DIRECT ACTION PLAN: ENVIRONMENT AND CLIMATE CHANGE, (2010), available at <http://www.liberal.org.au/~media/Files/Policies%20and%20Media/Environment/The%20Coalitions%20Direct%20Action%20Plan%20Policy.ashx>.

82. *Id.* at 2.

government intervention in the form of incentives to Australian families and businesses as a means of reducing emissions.⁸³ The government would provide incentives to existing industries seeking to reduce their emissions by adopting more efficient systems.⁸⁴ The government would also give incentives to other direct action measures required to reduce emissions, such as direct action on forestry, energy efficiency, recycling, and other necessary measures.⁸⁵ Furthermore, the government would make incentives available for renewable energy initiatives.⁸⁶ Like the 2007 election, climate change policy appeared to be a major, if not decisive, factor in the 2010 federal election.

The Australian business sector has also expressed concern over the CPRS. The Business Council of Australia and the Australian Chamber of Commerce and Industry oppose implementing a reduction scheme ahead of the rest of the world.⁸⁷ Indeed, a major concern of those opposed to the CPRS legislation was the Government's insistence that it be enacted into law before Copenhagen in order to provide the Australian Prime Minister with the moral authority to persuade other world leaders to follow Australia's lead and agree to far-reaching binding targets. In hindsight, these concerns appear well placed, for none of the three largest emitters—the United States, China, and India—was prepared to commit to binding reduction targets at Copenhagen. Thus, it is doubtful that other countries would feel compelled to follow Australia's lead given its relatively small percentage of global emissions (1.4%) and that under the CPRS, almost all trade-exposed industries, including coal, natural gas, iron ore, and cement, were either exempted entirely or heavily subsidized. As noted earlier, industry supports climate change policy as long as it does not result in actions that may negatively impact the competitiveness of Australia's products. The implementation of the CPRS in Australia would increase the price of carbon and, in the absence of similar increases in the carbon price in markets of other countries, result in the loss of competitiveness of Australian coal and other resource commodities.

An analysis of the merits and demerits of emission trading schemes in general may help provide objective input into the capacity of the CPRS to

83. *Id.* at 13–15.

84. *Id.* at 13–22.

85. *Id.* at 16–21.

86. *Id.* at 23–26.

87. CASTALIA, LTD., SECURING SMEs IN AUSTRALIA'S LOW CARBON FUTURE: THE COST OF THE CARBON POLLUTION REDUCTION SCHEME FOR AUSTRALIA'S SMALL AND MEDIUM SIZED BUSINESSES, REPORT TO THE AUSTRALIAN CHAMBER OF COMMERCE AND INDUSTRY 49 (June 2009), available at <http://www.acci.asn.au/getattachment/dbcff2d1-6301-4dd8-9efa-336af0f4e5e7/Securing-SMEs-in-Australia-s-Low-Carbon-Future.aspx>; *BCA Emissions Reduction*, BUS. COUNCIL AUSTR., <http://www.bca.com.au/Content/101469.aspx> (last visited Apr. 11, 2011).

achieve emission reduction targets. Emission trading schemes (ETSs) are internationally recognized as useful tools in climate change policy.⁸⁸ The origin of ETS has been traced to the United States where emission schemes were used to regulate the release of noxious gases into the atmosphere.⁸⁹ More recently, various countries have implemented emission schemes to mitigate climate change.⁹⁰ The growing popularity of these schemes suggests that they have some merit.

Two reasons for the growing popularity are that ETSs are both self-perpetuating and flexible. The more widespread the use of the trading schemes at a regional and international level, the more the international carbon market grows. This provides opportunities for individual countries and regions to benefit from economies of scale, thereby reducing their cost of GHG emission reduction.⁹¹ This is particularly attractive for countries like Australia where buying emissions reduction on the international carbon market would be cheaper than implementing local reductions.⁹² However, the Copenhagen Conference did not produce a legally binding agreement that would have created the framework for a strong international carbon market. Thus, the cost effectiveness of emission trading schemes will not be as high as anticipated. One of the other inherent strengths of these schemes is that they provide regulated industries with flexibility. Unlike direct intervention policy options, ETSs are very flexible after the caps are set.⁹³ This flexibility, assuming a properly functioning market, ensures that businesses choose the most cost effective means of reducing their GHG emissions.

Perhaps the most important advantage of ETSs is that they tackle the tragedy of the commons problem. Some argue that emissions trading internalizes environmental externalities, thus achieving one of the principles

88. The Kyoto Protocol makes provisions for the use of ETS. Kyoto Protocol, *supra* note 29.

89. A. DENNY ELLERMAN, PAUL L. JOSKOW & DAVID HARRISON, JR, EMISSIONS TRADING IN THE U.S.: EXPERIENCE, LESSONS, AND CONSIDERATIONS FOR GREENHOUSE GASES (2003), available at http://www.pewclimate.org/docUploads/emissions_trading.pdf [hereinafter ELLERMAN, JOSKOW & HARRISON, JR.].

90. Countries and regions that have implemented emission schemes include the United States, the European Union, New Zealand, Japan and South Korea.

91. The most comprehensive emissions trading system has been implemented by the EU. The EU ETS now operates in 30 countries (the 27 EU Member States plus Iceland, Liechtenstein and Norway). It covers CO₂ emissions from installations such as power stations, combustion plants, oil refineries and iron and steel works, as well as factories making cement, glass, lime, bricks, ceramics, pulp, paper and board; See Emissions Trading System (EU ETS), EUROPEAN COMMISSION CLIMATE ACTION, http://ec.europa.eu/clima/policies/ets/index_en.htm (last visited Apr. 10, 2011).

92. Michael Power, *Emissions Trading in Australia: Markets, Law and Justice Under the CPRS*, 27 ENVTL. & PLAN. L. J. 131 (2010).

93. ELLERMAN, JOSKOW & HARRISON, JR., *supra* note 101.

of environmentally sustainable development.⁹⁴ The economic value attached to carbon pollution is envisaged as a negative incentive to polluters and a positive incentive to green technology and industry.⁹⁵ However, there is evidence to challenge the assumption that an increase in the cost of carbon will create a positive incentive to develop green technology and industry.⁹⁶

Despite ETSs' perceived strengths, experience demonstrates that the system is not perfect. First, the entire system revolves around an artificially created market for a non-conventional commodity. The objective of this market, unlike others, is not only to sell the commodity, but also to sell it at a specific price. This artificial environment makes the emissions market particularly prone to distortion,⁹⁷ as evidenced by the EU-ETS experience.⁹⁸ When the EU-ETS was rolled out, businesses were given permits on the basis of self-generated emission level estimates.⁹⁹ Some businesses used this as an opportunity to increase their market edge by over-estimating their emission levels.¹⁰⁰ When subsequently accurate carbon dioxide emission levels were determined, the price of carbon plummeted.¹⁰¹ Design flaws in the duration of the permits also undermined the EU-ETS's effectiveness.¹⁰² Experience with emissions trading systems demonstrates that they may be more effective for bringing about widespread incremental change over a long period of time as opposed to a short period of time.¹⁰³

Most ETSs are faulted for enabling the government to dilute the impact of carbon price. For example, Rudd's ETS contains provisions that allow the government to protect the worst affected industries.¹⁰⁴

94. ELLERMAN, JOSKOW & HARRISON, JR., *supra* note 101, at 1.

95. *Id.* at 34.

96. JOSHUA S. GANS, INNOVATION AND CLIMATE CHANGE POLICY (2009), *available at* <http://works.bepress.com/cgi/viewcontent.cgi?article=1023&context=joshuagans>.

97. ELLERMAN, JOSKOW & HARRISON, JR., *supra* note 101.

98. A. DENNY ELLERMAN & PAUL L. JOSKOW, THE EUROPEAN UNION'S EMISSIONS TRADING SYSTEM IN PERSPECTIVE (2008), *available at* <http://www.pewclimate.org/docUploads/EU-ETS-In-Perspective-Report.pdf>.

99. A. Danny Ellerman and Barbara K Buchner, *The European Union Emissions Trading Scheme: Origins, Allocation, and Early Results*, 1 REVIEW OF ENVIRONMENTAL ECONOMICS AND POLICY 66–87.

100. *Id.*

101. *Id.* at 14–15.

102. *Id.*

103. James Prest, *A Dangerous Obsession with Least Cost? Climate Change, Renewable Energy Law and Emissions Trading*, in CLIMATE CHANGE LAW: COMPARATIVE, CONTRACTUAL & REGULATORY CONSIDERATIONS (Wayne. Gumley & Trevor Daya-Winterbottom eds., 2009).

104. These included, for example, the cement and aluminium industries. The CPRS would also grant billions of dollars worth of free permits to industry. The Emissions Intensive Trade Exposed (EITE) assistance program would give large emitters exposed to international markets up to 94.5 percent of their permits for free. *See* Aaron Cook, *Carbon*

Additionally, ETSs around the world tend to establish very generous caps for certain industries or provide them with free permits.¹⁰⁵ Australia's CPRS runs the risk of resorting to this practice known as "grandfathering."¹⁰⁶ The most effective way to avoid this risk would be for the industries likely to be the beneficiaries of such government protection to voluntarily commit to carbon reduction.

One of the greatest ETS challenges is that it is an economic mechanism that works like a blanket tax on all individuals regardless of their income level and capacity to pay. The establishment of a carbon price would impact the price of basic goods such as fuel, electricity, and groceries.¹⁰⁷ Since demand for such goods is inelastic, it would result in a disproportionate burden on low-income households. Further, carbon alternative technologies require high costs of installation, which may make them inaccessible to the low-income households.¹⁰⁸

Apart from its inherent weaknesses, the Australian ETS also depends on the adoption of similar market mechanisms in the global coal market. As noted earlier, all reviews and recommendations on climate change policy in Australia indicate that success of an ETS depends on its adoption by trading partners and other stakeholders in the global coal market.¹⁰⁹ The success of Australia's ETS thus depends on the adoption of cap and trading schemes by other large producers and consumers of coal such as the United States, India, and China.

The Copenhagen Accord demonstrated that the world is still far from developing a global mechanism for carbon trade as the means of reducing GHG emissions. China and India do not support the development of the ETS. President Obama's government initially supported a cap and trade scheme, but recent trends indicate that the government's position is likely to shift. Furthermore, the Obama administration did not pursue the passage of the ETS before the mid-term elections in November 2010. Both Democrats and Republicans were wary of anything that might impede the recovery of the U.S. economy and increase energy costs in an election year. Moreover, the Australian government conceded that it might remove the emissions trading scheme from its climate change bill before it goes to the Senate.¹¹⁰

reduction schemes explained, ABC Environment, Feb. 23, 2010, available at <http://www.abc.net.au/environment/articles/2010/02/23/2827485.htm>.

105. Ellerman and Buchner, *supra* note 109.

106. Power, *supra* note 104.

107. See THE COAL PARTY AUSTL., *supra* note 90, at 3.

108. GARNAUT, *supra* note 75.

109. GARNAUT, *supra* note 71.

110. James Murray, *Senator Graham: US Cap and Trade Plan is 'Dead,'* BUS. GREEN (Mar. 3, 2010), <http://www.businessgreen.com/business-green/news/2258845/graham-cap-trade-plan-dead>.

If Australia's CPRS depends on similar policy action by other large economies, then the future of an emission trading scheme is bleak.¹¹¹

Recently, the Rudd administration's CRPS policy faced a considerable setback when one of its major climate change initiatives resulted in more than 100 homes burning to the ground. The climate change initiative was intended to provide heavily subsidized home insulation to homeowners. Ignoring numerous warnings over safety concerns, the lack of properly trained installers, and inadequate regulatory safeguards, the government rolled out the program as part of its financial stimulus package to counter the GFC.¹¹² The A\$2.5 billion insulation scheme was part of a government plan to provide insulation to 2.7 million houses across Australia.¹¹³ So far more than a million homes have been insulated. However, more than 100 homes have caught fire as a result of improperly installed aluminum foil insulation. The insulation caught fire after being exposed to electrical wiring in roof cavities.¹¹⁴ Thousands more homes remain at risk. The situation was exacerbated when four young, improperly trained electricians were electrocuted.¹¹⁵

Facing intense political pressure, the government publicly admitted its responsibility, and cancelled the entire program. It ordered inspections of the hundreds of thousands of existing homes where insulation had been installed.¹¹⁶ The estimated cost of the cleanup could be as high as A\$100 million.¹¹⁷ The Prime Minister has since demoted the Environment Minister responsible for the program and appointed a junior minister to handle the aftermath.¹¹⁸ The failed insulation program has only served to reduce the popularity of the government's entire climate change policy and raise questions as to the Rudd government's ability to properly administer

111. Brad Norington, *Obama's Cap-and-Trade Scheme Faces Defeat*, AUSTRALIAN (Mar. 2, 2010), <http://www.theaustralian.com.au/national-affairs/climate/obamas-cap-and-trade-scheme-faces-defeat/story-e6frg6xf-1225835821898>.

112. Roger Wettenhall, *Global Financial Crisis: The Australian Experience in International Perspective*, 11 PUB. ORG. REV. 77 (2011).

113. Brian Dollery & Martin Hovey, *Australian Federal Government Failure: The Rise and Fall of the Home Insulation Program*, 29 ECON. PAPERS 251, 342, (2010).

114. See Sid Maher & Matthew Franklin, *Peter Garrett Resists Call for his Resignation over Roof Insulation Debacle*, AUSTRALIAN (Feb. 12, 2010), <http://www.theaustralian.com.au/politics/peter-garrett-resists-call-for-his-resignation-over-roof-insulation-debacle/story-e6frgczf-1225829696127>.

115. Calls for firing the Federal Environment Minister have been rebuffed so far by the Prime Minister. See Maher & Franklin, *supra* note 131.

116. Brian Dollery & Martin Hovey, *supra* note 126.

117. See Andrew Probyn & Andrew T. Canberra, *Insulation Debacle Bill Breaks \$100m Mark*, W. AUSTL. (Feb. 25, 2010), available at <http://au.news.yahoo.com/thewest/a/-/newshome/6850442/insulation-debacle-bill-breaks-100m-mark/>.

118. See CHRIS AULICH ET AL., *THE RUDD GOVERNMENT – AUSTRALIAN COMMONWEALTH ADMINISTRATION 2007 - 2010* (Chris Aulich & Mark Evans, eds., 2010), available at <http://epress.anu.edu.au/anzsog/rudd/pdf/whole.pdf#page=191> (last visited Mar. 16, 2011).

large-scale programs.¹¹⁹ In the wake of this debacle, the opposition succeeded in putting off the discussion of the CPRS until May 2010.

The challenges faced by the EU-ETS demonstrate that the most effective way to ensure that the systems work properly is not the development of tightly regulated ETSs by governments but rather commitment by industry to reduce GHG emissions. If industry players are convinced of the need to reduce GHG emissions, they would not seek to frustrate the market.

B. Other Technological Innovations to Reduce Emissions

Australia has included investment in environmentally friendly technologies in its climate change policies. These technologies fall within three main categories: technologies that offset or abate carbon pollution; technologies that increase the efficiency of fossil fuel production; and technologies that utilize renewable energy sources.¹²⁰ These technologies include: (1) carbon capture and storage; (2) biofuels; (3) (natural) carbon sequestration; (4) biochar technology; and (5) renewable energy sources.

1. Carbon Capture and Storage (CCS)

Carbon capture and storage (CCS) is a clean coal technology that offsets or abates carbon pollution. Its viability in the reduction of GHG emissions is being explored. As its name suggests, the technology involves the capture of carbon dioxide and its accumulation or storage in deep geological formations.¹²¹ This technology is particularly attractive in the efforts to reduce GHG emissions because of its projected success in significant short-term reduction of GHG emissions.¹²² Some argue that CCS can reduce GHG emissions to almost zero.¹²³ According to the PRISM analysis, a study performed by the Electric Power Research Institute (EPRI) in the United States, wide deployment of CCS after the year 2020 could reduce carbon dioxide emissions in the United States power sector alone by about 350 million tons of carbon dioxide per year (Mt CO₂/yr) by 2030.¹²⁴ This reduction rate is higher than the Kyoto

119. *Id.*

120. GANS, *supra* note 108, at 2.

121. *What is CCS?*, GLOBAL CCS INST., <http://new.globalccsinstitute.com/ccs/what-is-ccs> (last visited Mar. 16, 2011).

122. *Why Do We Need CCS*, GLOBAL CCS INST., <http://new.globalccsinstitute.com/ccs/why-do-we-need-ccs> (last visited Mar. 16, 2011).

123. *Id.*

124. ELEC. POWER RESEARCH INST. ENERGY TECH. ASSESSMENT CTR., *THE POWER TO REDUCE CO₂ EMISSIONS - THE FULL PORTFOLIO* (2007).

Protocol target for reduction of EU emissions in the five-year period between 2008 and 2012.¹²⁵

Apart from its impressive potential to reduce GHG emissions, CCS is particularly attractive to the coal industry¹²⁶ because it best maintains the status quo. CCS allows industries that rely heavily on fossil fuels to continue to do so, provided they can capture their carbon dioxide emissions and safely store these away. This may explain the Australian government's support for CCS, given the country's heavy reliance on fossil fuels for its energy production. Regardless of the motive in support for CCS, it is important to objectively determine the merits of CCS in GHG emissions reduction. Government and industry must ask the difficult questions in order to determine whether CCS is merely wishful thinking or a meaningful part of the climate change solution.¹²⁷

CCS is a fairly new technology. According to a 2010 report commissioned by the Global CCS Institute, as of 2009 there were a total of 275 CCS projects at different stages around the world.¹²⁸ This appears to be a fairly large number; however, only sixty-two of these projects may be considered active or planned, of a commercial scale, and integrated, demonstrating the entire CCS process chain of carbon dioxide capture, transport, and storage.¹²⁹ Not one of the sixty-two integrated projects is completed. Furthermore, there were about thirty-four completed projects, but none of these could be considered integrated.¹³⁰

In terms of total projects, regardless of state of completion and integration, the most active region is the United States, followed by Europe. Australia and New Zealand are ranked third, accounting for ten percent of the total number of identified CCS projects.¹³¹ This is because over the last six years, the Australian government has shown commitment and support for research initiatives on the development of CCS technologies and

125. *Id.*

126. The Australian Coal Association has described CCS as "one of the most promising long term solutions" for reducing GHG emissions. See *Coal and the Environment*, AUSTL. COAL ASS'N, <http://www.australiancoal.com.au/coal-and-the-environment.aspx> (last visited Dec. 27, 2010).

127. Michael Jeffery, *Carbon Capture and Storage: Wishful Thinking or a Meaningful Part of the Climate Change Solution*, 27 PACE ENVTL. L. REV. 1 (2009), available at <http://digitalcommons.pace.edu/envlaw/572>.

128. GLOBAL CARBON CAPTURE & STORAGE INST., STRATEGIC ANALYSIS OF THE GLOBAL STATUS OF CARBON CAPTURE AND STORAGE PROJECTS 41 (2010), available at http://new.globalccsinstitute.com/sites/default/files/Report%201-Status%20of%20Carbon%20Capture%20and%20Storage%20Projects%20Globally_2.pdf [hereinafter STRATEGIC ANALYSIS OF THE GLOBAL CCS PROJECTS].

129. *Id.* at 41.

130. *Id.* at 43–44.

131. *Id.* at 42.

supporting regulatory framework.¹³² Included in the sixty-two projects regarded as integrated are the following projects from Australia: the Lassie in Victoria; the FuturGas in Southern Australia; ZeroGen and Wandoan Power in Queensland; and Browse LNG, Gorgon Project, and Coolimba in Western Australia.¹³³ These projects indicate Australia's significant progress in the area of CCS research and development. However, none of the seven projects is in the stage of execution or operation. Thus, adequately assessing the technical feasibility and large-scale commercial viability of the CCS projects is difficult.

The confirmation of the technological feasibility or commercial viability of a project does not necessarily guarantee its success in achieving the impressive GHG emission reductions anticipated.¹³⁴ The Global CCS Report confirms this, recognizing that, though many CCS projects have been launched, thus meeting the first objective of the G8, only a few of these projects are likely to reach the operational stage. The failure rate is attributed to a "constellation of challenges" associated with CCS.¹³⁵ The report points out that the exact nature of these difficulties is not easy to determine.¹³⁶ This is because proponents of failed projects are reluctant to disclose any information that would provide insight on reasons for the failure. Additionally, general deployment challenges can be inferred from analyzing similar technological projects.

The report makes an important observation regarding the risks associated with transport and carbon storage. Of the sixty-two projects analyzed, almost half have been classified as dependent. This classification indicates that these projects are integrated in capture, transport, and storage; however, although the functions are integrated into one CCS system, transportation and storage are in reality carried out by an entity separate from the entity carrying out capture.¹³⁷ The dependence on a separate entity to organize storage introduces new risks related to capacity of that entity to transport and store captured carbon, as well as increased risks of lag time due to the current emphasis on capture component development.¹³⁸

Apart from the challenges identified by the Global CCS Institute Report, there is literature on general challenges associated with CCS projects. This literature indicates that, as with all other novel technologies,

132. *Copenhagen Accord*, *supra* note 33.

133. STRATEGIC ANALYSIS OF THE GLOBAL CCS PROJECTS, *supra* note 146, at 8, 11, 65, 67.

134. Varun Rai, David G. Victor & Mark C. Thurber, *Carbon Capture and Storage at Scale: Lessons from the Growth of Analogous Energy Technologies* 38 ENERGY POL'Y 4089 (2009), available at <http://ssrn.com/abstract=1400163>.

135. Power, *supra* note 104, at 82.

136. STRATEGIC ANALYSIS OF THE GLOBAL CCS PROJECTS, *supra* note 146.

137. *Id.* at 87.

138. *Id.*

the success of CCS is dependent on a whole array of factors, which include the development of regulatory and incentive policies to support its adoption as a business model.¹³⁹ At present, no one has any actual CCS experience, which prevents a thorough analysis of the adequacy of Australia's regulatory framework.

The uncertainty and risk of failure in CCS suggests that it may not be the most effective policy option for the reduction of GHG emissions. The Australian government and corporations within the coal industry are currently investing significantly in CCS. Given the analysis above, such investment may not be justified and perhaps should be redirected to more certain and long term GHG emission reduction technologies.

2. *Biofuels*

Predicted global shortages of fossil fuels encouraged the search for better and more viable options for energy to be used in transportation, such as biofuels.¹⁴⁰ Biofuels are liquid, solid, or gaseous fuels derived from renewable biological sources. Sourced from biomass, primarily renewable biological plant matter, or from products derived from plant matter, biofuels can be burned directly for thermal energy or converted to other high-value energy sources including ethanol, biodiesel, methanol, hydrogen, or methane.¹⁴¹ Currently, ethanol from corn grain and biodiesel are the only biofuels produced on an industrial scale in the United States.¹⁴² Countries such as the United States, Canada, and Brazil, where consumers seeking cheaper alternative fuels have increasingly accepted biofuels, offer massive agricultural subsidies to farmers producing biofuel crops.¹⁴³

In Australia, research into second-generation biofuels has expanded significantly. Unlike first generation biofuels that are limited by agronomic characteristics of annual crops and production on arable land, second generation biofuels can be sourced from lignocelluloses, which is a collective term for lignin, cellulose, and hemicellulose components of plant and woody materials with a particular focus on conversion processes.¹⁴⁴

139. *Id.*

140. Angelo C. Pinto et al., *Biodiesel: An Overview*, 16 J. BRAZ. CHEMICAL SOC'Y 1313 (2005).

141. *See id.*

142. U.S. DEP'T OF ENERGY, FACT SHEET: GAS PRICES AND OIL CONSUMPTION WOULD INCREASE WITHOUT BIOFUELS (2008), available at http://www.energy.gov/media/FactSheet_Biofuels_Lower_Gas_Prices.pdf.

143. Laura J. Loppacher & William A. Kerr, *Can Biofuels Become a Global Industry?: Government Policies and Trade Constraints*, CENTRE FOR ENERGY, PETROLEUM & MIN. L. & POL'Y, June 2005, http://www.dundee.ac.uk/cepmlp/journal/html/Vol15/article15_10.html (last visited Mar. 16, 2011).

144. ANDREW C. WARDEN & VICTORIA S. HARITOS, RIRDC, FUTURE BIOFUELS FOR AUSTRALIA - ISSUES AND OPPORTUNITIES FOR CONVERSION OF SECOND GENERATION

However, in recent years both scientists and the environmental movement have increasingly criticized the benefits of biofuels because of their huge environmental cost. Apart from raising serious food security issues, biofuels are also suspected of emitting higher levels of GHGs than previously thought.¹⁴⁵ Producing biofuels to be used in the United States, Canada, or the EU exacts a high cost to the natural ecosystems of Brazil and other South American and Asian countries, as biofuel production adds to the depletion of rainforest and grasslands.¹⁴⁶ The U.S. Environmental Protection Agency (EPA) recently acknowledged that ethanol can lower air quality and increase smog.¹⁴⁷ According to a study recently published in *Science*, co-author Joe Fargione, a regional scientist for the Nature Conservancy, found that “converting rainforests, peatlands, savannas, or grasslands to produce biofuels in Brazil, Southeast Asia, and the United States creates a ‘biofuel carbon debt’ by releasing 17 to 420 times more carbon dioxide than the fossil fuels they replace.”¹⁴⁸ Corn and soybean based biofuels also negatively impact the environment because they cause eutrophication; biodiversity loss, and elevated nitrogen levels in the environment.¹⁴⁹ However, there are still mixed and conflicting opinions about the impact of biofuels on the environment. The active and passive impacts of biofuels can be ecosystemic (on biodiversity, water, and carbon) and/or social (including economic and political) in ecosystems across the globe.¹⁵⁰

Responding to recent concerns surrounding biofuels-based research, Indian scientists have focused on a new plant named *Jatropha* (*Jatropha curcas* L.), euphemistically named “Seeds of Hope,” that can be grown almost anywhere with almost no requirement of water, fertilizer, or fertile soil conditions.¹⁵¹ Furthermore, it is not edible, posing little or no threat to present or future food supplies. Even the production cost of *Jatropha* is half

LIGNOCELLULOSICS (2008), available at <https://rirdc.infoservices.com.au/downloads/08-117.pdf>.

145. *Climate Change and Energy: The True Cost of Biofuels*, NATURE CONSERVATORY, <http://www.nature.org/initiatives/climatechange/features/art23819.html> (last visited Dec. 27, 2010) [hereinafter *Climate Change and Energy*].

146. *Id.*

147. See Robert K. Nevin, *Ethanol in Gasoline: Environmental Impacts and Sustainability Review Article*, 9 RENEWABLE AND SUSTAINABLE ENERGY REVIEWS 535 (Dec. 2005).

148. See *Climate Change and Energy*, *supra* note 161.

149. See Jason Hill et al., *Environmental, Economic, and Energetic Costs and Benefits of Biodiesel and Ethanol Biofuels*, 103 PROCEEDINGS OF THE NAT'L ACAD. OF SCI. 11206 (2006). See also Pinto et al., *supra* note 162.

150. Donald Sawyer, *Climate Change, Biofuels and Eco-social Impacts in the Brazilian Amazon and Cerrado*, 363 PHILOSOPHICAL TRANSACTIONS OF THE ROYAL SOC'Y. 1747 (2008).

151. See Patrick Barta, *Jatropha Plant Gains Steam In Global Race for Biofuels: Hardy Shrub Is Tapped For Energy-Rich Seeds; Indian Farmers' Big Bet*, WALL ST. J., Aug. 24, 2007, at A1, available at http://online.wsj.com/article/SB118788662080906716.html?mod=hps_us_pageone.

that of corn and one third that of rapeseed and other major sources of alternative energy.¹⁵² Considering the relative advantages of Jatropha, Australian based company Mission Biofuels Ltd. has raised A\$80 million from investors and commenced contract farming 66,000 acres of the plant with a target to reach up to 250,000 acres by 2010.¹⁵³

Despite the initial optimism of GHG emission reduction through biofuels, recent research has uncovered two potentially serious concerns: (1) adverse effects on food security in countries that can least afford instability and (2) whether biofuels contribute to a net reduction of GHG emissions.¹⁵⁴ These reservations have refocused further research on other strategies such as carbon sequestration (through agroforestry) and biochar technology (storing carbon in soil) as commercially viable options to mitigate and address climate change through the involvement of Australia's corporate sector.

3. (Natural) Carbon Sequestration

Carbon sequestration is the generic term used to describe the capture and storage of carbon dioxide. Capture can take place at the point of emission (e.g. power plants) or through natural processes (e.g. photosynthesis), which removes carbon dioxide from the atmosphere and transforms trees and other forms of vegetation into carbon sinks.

Through photosynthesis, plants use sunlight to convert carbon dioxide from the atmosphere to carbohydrates for their growth. Natural terrestrial system sinks already sequester one third of the carbon dioxide emissions from fossil fuel combustion.¹⁵⁵ Though the uptake of carbon dioxide decreases with time as plants grow to their full capacity and become limited by other resources, sequestration still provides a viable method of relatively short-term climate change mitigation.¹⁵⁶ Australian energy giants like Woodside Petroleum, Eraring Energy, BHP Billiton, and Rio Tinto can play a substantive role in sequestration advancement by investing in the GHG emission-offsetting program that establishes carbon sinks. "[T]ropical reforestation has the potential to serve as a carbon offset mechanism"¹⁵⁷ both above ground and underground for a period of forty to eighty years,

152. *Id.*

153. *Id.*

154. See Max Rutherford, *Biofuels: Pros and cons*, BIOFUELSWATCH.COM, <http://www.biofuelswatch.com/biofuels-pros-and-cons/> (last visited Mar. 16, 2011).

155. Walker, B., & W. Steffen. *An Overview of the Implications of Global Change for Natural and Managed Terrestrial Ecosystems*, ECOLOGYANDSOCIETY.ORG (1997), <http://www.consecol.org/vol1/iss2/art2> (last visited Mar. 16, 2011).

156. *Id.*

157. W. L. Silver et al., *The Potential for Carbon Sequestration Through Reforestation of Abandoned Tropical Agricultural and Pasture Lands*, 8 RESTORATION ECOLOGY 394 (2000).

which may be beneficial for long term carbon sequestration to mitigate the impacts of climate change.¹⁵⁸ Contemporary changes in the amount of carbon stored in forests and grasslands are influenced both by the land management and environmental conditions of the area. Furthermore, the emerging growth of the biofuels industry will likely have a substantial impact on carbon storage issues.¹⁵⁹

Large private and public corporate players in the energy sector have made significant moves toward implementing GHG abatement strategies.¹⁶⁰ Woodside Petroleum, which currently produces approximately forty percent of Australia's gas and oil, is participating in a GHG emission reduction program through technical and other means.¹⁶¹ Under this initiative, Woodside signed a contract with CO2 Group Limited to establish a permanent carbon sink by planting mallee eucalyptus in Western Australia.¹⁶² The project will cost A\$100 million over a period of fifty years.¹⁶³ Even in the United Kingdom, the issue of forest footprints is gaining momentum. Leading companies have demonstrated their commitment to the "Disclosure Request," which makes companies accountable to both investors and consumers for their impact on the world's forest.¹⁶⁴

Eraring Energy, a large, state-owned, coal-based power generation company in New South Wales,¹⁶⁵ also initiated a sequestration project in support of reducing its carbon footprint. Eraring Energy's active cooperation with CO2 Group Limited will establish 1,100 hectares of mallee eucalyptus plantation in Western Australia.¹⁶⁶

158. *Id.*

159. Christine Negra et al., *Indicators of Carbon Storage in U.S. Ecosystems: Baseline for Terrestrial Carbon Accounting*, 37 J. ENVTL. QUALITY 1376 (2008).

160. See CO2 Group Limited, *Submission to the Senate Standing Committee on Economics Committee Inquiry into the Carbon Pollution Reduction Scheme Bill 2009*, SENATE STANDING COMMITTEE ON ECON. (June 4, 2009), available at http://www.aph.gov.au/Senate/committee/economics_ctte/cprs_2_09/submissions/sub37.pdf. [BB 18.2.3, T2.2 – Not sure about this one. Seems since it's a PDF and website is an "official" Aussie site, that this may not be the correct format]

161. S.A. RYAN ET. AL., WOODSIDE ENERGY, LTD., , RESPONSIBLE ENVIRONMENTAL MANAGEMENT LEADS TO IMPROVED RESOURCE RECOVERY - THE LAMINARIA / CORALLINA GAS RE-INJECTION PROJECT (SOC'Y OF PETROLEUM ENGINEERS 2001), available at <http://www.onepetro.org/mslib/servlet/onepetroreview?id=00072101&soc=SPE>.

162. See CO2 AUSTRALIA, <http://www.co2australia.com.au/index.php?sectionID=6718&pageID=7306> (last visited Mar. 16, 2011).

163. *Reducing Greenhouse Gas Emissions*, WOODSIDE, <http://www.woodside.com.au/Sustainable+Development/Climate+Change/Emissions+Reduction.htm> (last visited Mar. 16, 2011).

164. *Annual Review*, FOREST FOOTPRINT DISCLOSURE, <http://www.forestdisclosure.com/page.asp?p=4714> (last visited Mar. 16, 2011).

165. ERARING ENERGY, <http://www.eraring-energy.com.au> (last visited Mar. 16, 2011).

166. See CO2 AUSTRALIA, *supra* note 179.

4. Biochar Technology

Biochar technology, a new way of storing carbon in soil, is gaining momentum with its initial promising outcomes. Biochar is a type of charcoal that results from heating organic materials such as crop residues, wood chips, and municipal waste.¹⁶⁷ Where complete burning is prohibited, it can replace slash and burn with slash and char techniques. This technology is chemically stable and can help with the long-term mitigation of climate change through the storage of carbon dioxide for hundreds to thousands of years.¹⁶⁸ This biomass-derived charcoal came to light with the availability of charcoal rich soil in the Amazon basin known as *terra preta*.¹⁶⁹

The International Biochar Initiative (IBI), formed in 2006, promotes the research, development, demonstration, deployment and commercialization of biochar technology.¹⁷⁰ According to the IBI, the benefits of biochar technology are massive. It would remove about 1.2 billion metric tons of carbon from the atmosphere each year, which would offset the current twenty-nine percent net rise in atmospheric carbon.¹⁷¹ Furthermore, biochar, along with chemical fertilizer (NPK), can increase the growth of the yield of a crop up to fifty percent.¹⁷²

Though biochar technology is still at a nascent stage in its development, it raises the possibility of providing large-scale carbon storage than carbon sequestration through afforestation and expanding tree coverage.¹⁷³ Forests are able to capture and sequester carbon only while growing, and there is always the risk of total destruction of forest or plantations due to catastrophe or infestation. Soil borne charcoal (i.e. biochar) is potentially more stable.¹⁷⁴ It is therefore attracting widespread interest from the corporate sector as a possible investment vehicle of the future. As with other forms of mitigation/abatement

167. *What is Biochar?*, INT'L BIOCHAR INITIATIVE, <http://www.biochar-international.org/biochar> (last visited Mar. 16, 2011).

168. *Environmental Benefits of Biochar: Global Warming*, INT'L BIOCHAR INITIATIVE, <http://www.biochar-international.org/biochar/benefits> (last visited Mar. 16, 2011).

169. *Biochar Use in Soils: Biochar and Terra Preta Soils*, INT'L BIOCHAR INITIATIVE, <http://www.biochar-international.org/biochar/soils> (last visited Mar. 16, 2011).

170. *About Us: IBI History*, INT'L BIOCHAR INITIATIVE, <http://www.biochar-international.org/about> (last visited Mar. 16, 2011).

171. *See How Much Carbon Can Biochar Systems Offset - and When?*, INT'L BIOCHAR INITIATIVE, http://www.biochar-international.org/images/final_carbon.pdf (last visited Mar. 16, 2011).

172. *Id.*

173. *See* CSIRO, BIOCHAR, <http://www.csiro.au/files/files/pnzp.pdf> (last visited Mar. 16, 2011).

174. *Id.*

strategies, biochar needs to be carefully examined from environmental, social, and technological perspectives.

In the post-Kyoto period after 2012, biochar technology could be the preferred solution over other carbon sequestration initiatives because Australian industries may be able to buy certified emission reductions (CERs) to offset their emissions of GHG. If biochar is recognized as an efficient clean development mechanism (CDM), there will also be enormous opportunities for developing countries to benefit from this new technology. Despite its benefits, Friends of the Earth (Australia) have expressed their concern that the introduction of biochar technology may further erode the rights of indigenous peoples through their displacement from traditional lands.¹⁷⁵

5. Renewable Energy Sources

Renewable energy is derived from sources that can be replenished. The main types of renewable energy sources include solar, water, wind, geothermal, and biomass. Given the finite nature of fossil fuels and the adverse environmental effects of burning fossil fuels, the most effective long-term solution to carbon pollution would be a switch to renewable energy sources. Renewable energy results in either fewer carbon dioxide emissions than fossil fuels (as with biomass), or in some cases, zero emission of carbon dioxide (as with solar, wind, and hydro power). Unfortunately, the efficient generation of energy from these renewable sources in a cost effective manner remains a challenge, discouraging the adoption of renewable energy as a primary climate change solution.

Australia has great potential for establishing a renewable energy industry. One study concluded that, assuming a single grid supplied the world's energy, all energy could be supplied by eight large-scale solar generation plants, with Australia providing twenty-one percent of this energy.¹⁷⁶ Despite this potential, Australia's renewable energy industry has not been vibrant. The slow development of the renewable energy industry is attributable to the lack of coordination between federal and state governments, which undermines renewable energy development.¹⁷⁷ Further, lack of a framework to offset the market price against environmental savings that resulted from the use of renewable sources

175. See Rye Senjen, *Biochar—Another Dangerous Technofix*, 106 CHAIN REACTION (Aug. 2009), available at <http://www.foe.org.au/resources/chain-reaction/editions/106/biochar-2212-another-dangerous-technofix>.

176. Quanhua Liu et al., *Solar Radiation as Large-Scale Resource for Energy-Short World*, 20 ENERGY & ENV'T 319 (2009).

177. *Id.*

contributed to the stunted growth of the industry.¹⁷⁸

The absence of coordination and framework, coupled with a general perception that renewable energy increases the cost of electricity, has held back the development of renewable energy technology in Australia. The previous government's apparent lack of conviction in the feasibility of renewable energy did not help. John Howard, the former Prime Minister, reportedly stated, "You can't run power stations on solar and wind [...] [L]et's be realistic, you can only run power stations in a modern Western economy on fossil fuel, or in time, nuclear power."¹⁷⁹ Such a position by the head of government may explain why the period recorded such little success in overcoming the barriers that inhibit the growth of the renewable energy industry.¹⁸⁰

Despite its current focus on an ETS, Australia's climate change and environmental policies recognize the importance of renewable energy.¹⁸¹ The government has established the Australian Centre for Renewable Energy (ACRE). The objective of the center is to "promote the development, commercialization, and deployment of renewable energy and enabling technologies."¹⁸² The center is a component of the Clean Energy Initiative, which receives significant government funding.¹⁸³

Notwithstanding current government investment in renewable energy, the percentage of energy generated from these sources continues to be minimal. According to a 2009 report by the Australian Bureau of Agricultural and Resources Economics (ABARE), the majority of Australia's electricity supply continues to come from coal, which accounted for eighty-one percent of fuel inputs into electricity generation in the year 2007-2008.¹⁸⁴ In contrast, fuel inputs from renewable sources amounted to only three percent.¹⁸⁵ However, recently the number of new projects for the generation of electricity from renewable energy sources has increased.

178. August Schläpfer, *Hidden Biases in Australian Energy Policy*, 34 RENEWABLE ENERGY 456 (2009).

179. *PM Pushes Nuclear Power Case*, SYDNEY MORNING HERALD, Feb. 3, 2007.

180. Stephen Jones, *The Future of Renewable Energy in Australia: A Test for Cooperative Federalism?*, 68 AUSTL. J. PUB. ADMIN. 1 (2009).

181. *Renewable Energy*, AUSTL. GOV'T DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, <http://www.environment.gov.au/settlements/renewable/index.html> (last updated Aug. 13, 2010).

182. *Australian Centre for Renewable Energy*, AUSTL. GOV'T DEP'T RES., ENERGY & TOURISM, <http://www.ret.gov.au/energy/energy%20programs/cei/acre/Pages/default.aspx> (last updated Dec. 7, 2010).

183. See DEP'T OF RES., ENERGY AND TOURISM, CLEAN ENERGY INITIATIVE (2009), available at [http://www.ret.gov.au/Department/Documents/CEI%20Fact%20Sheet%20\(13%20May%2009\).pdf](http://www.ret.gov.au/Department/Documents/CEI%20Fact%20Sheet%20(13%20May%2009).pdf).

184. ALAN COPELAND, AUSTL. BUREAU AGRIC. & RES. ECON., ELECTRICITY GENERATION MAJOR DEVELOPMENT PROJECTS - OCTOBER 2009 LISTING 4 (2009), available at http://www.abareconomics.com/publications_html/energy/energy_09/EG09_Oct.pdf.

185. *Id.*

Between April and October 2009, there were thirty new electricity generation projects.¹⁸⁶ Of these projects, twenty-three are wind driven, three are coal fired, and one is fuelled by geothermal energy.¹⁸⁷ The largest of the completed projects is the 140-megawatt Capital Wind Farm located in New South Wales.

Despite their high cost, the output of these projects is small compared to that of the fossil fuel power plants.¹⁸⁸ Such output is to be expected because research shows that even the capacity generated from mature renewable energy technology would still be significantly less than that from coal fired plants.¹⁸⁹ However, this is to be expected considering the novelty of the technology and the resulting market imperfections. The role of renewable energy policy should be to correct the imperfections so as to boost the new technologies.

In August 2009, Australia enacted the Renewable Energy Target Scheme (RET), an expansion of the Mandatory Renewable Energy Target Scheme (MRET).¹⁹⁰ Under the RET, the government pledged that by 2020, twenty percent of Australia's electricity supply will come from renewable energy sources.¹⁹¹ Though the Australian target of twenty percent seems high and is similar to that of the European Union, the Australian target, unlike that of the EU, is not entirely a percentage target. If Australian demand for electricity increases, the actual target would be adjusted to be less than twenty percent.¹⁹² Apart from expanding renewable energy targets, the RET will provide incentives to encourage the use of renewable sources of energy such as solar, wind, biomass, and geothermal energy.¹⁹³ The RET is based on a market for Renewable Energy Certificates (RECs). The RECs also extend to non-generating activities such as solar water heaters.¹⁹⁴ Reservations remain as to whether solar and wind renewable energy sources are in a position to supply the country's base-load requirement with cheap coal as competition. These reservations appear to be supported in part by the Australian Geothermal Energy Association.¹⁹⁵ So far, most existing RECs have been from the use of solar heaters, rather

186. *Id.* at 11.

187. *Id.*

188. *Id.* at 7.

189. *Id.*

190. *Renewable Energy Target*, AUSTL. GOV'T DEP'T CLIMATE CHANGE & ENERGY EFFICIENCY, <http://www.climatechange.gov.au/en/government/initiatives/renewable-target.aspx> (last updated Dec. 24, 2010).

191. *Id.*

192. Prest, *supra* note 117, at 184.

193. *Id.*

194. *Id.*

195. See *Submission to the Senate Economics Committee's Inquiry into the Renewable Energy (Electricity) Amendment Bill 2009*, AUSTL. GEOTHERMAL ENERGY ASS'N (July 24, 2009), http://www.agea.org.au/media/docs/senate_inquiry_into_the_ret.pdf.

than from actual electricity generation.¹⁹⁶ The capacity of the government to meet the twenty percent target by 2020 is dependent on an array of factors. Time will tell if the RET encourages derivation of energy from renewable sources.

The current government seems to be adopting a mix of policy options in the mitigation of climate change. Therefore, renewable energy policies are not operating within a vacuum but rather in the context of other policies such as the CPRS. They are influenced by technologies seeking to abate or offset carbon pollution in the course of power generation from fossil fuels. Whereas each of these policies considered on its own may be effective in reducing GHG emissions, combining policies may have the effect of stalling investment in other policy options. This may be the case with the mix of CCS and renewable energy policies. Thus, the government should consider redirecting resources to the more effective long-term policy option, as opposed to the more cost effective short-term option.

Calls for a national debate in Australia on the nuclear energy option are becoming more frequent, as many other countries rely on this technology for a significant proportion of their energy requirements.¹⁹⁷ Current government policy has ruled out the use of nuclear power.¹⁹⁸ After Copenhagen, public opinion appeared to shift from outright opposition to a realization that, in the face of climate change, all realistic options should at the very least be debated. The fact that Australia is the third largest exporter of uranium (after Canada and Kazakhstan),¹⁹⁹ and President Obama's announcement on February 16, 2010, of funding for the construction of the United States' first new nuclear power plant in nearly three decades, has been noticed in Australia as it seeks reliable, less polluting ways to meet its energy requirements and international commitments.²⁰⁰ A serious national nuclear debate will very likely take place in Australia at some point in the near future.²⁰¹

196. Craig Froome, *Renewable Energy in Australia: 20 Per Cent by 2020: Can this be Achieved?*, 21 MGMT. ENVTL. QUALITY: AN INT'L J. 177 (2010).

197. Calls for a nuclear power debate in Australia have intensified and include members of the Gillard Labour government. See Steve Lewis, *Julia Gillard faces nuclear power push*, PERTH NOW (Dec. 1, 2010, 6:24 AM), <http://www.perthnow.com.au/news/julia-gillard-faces-nuclear-power-push/story-e6frg12c-1225963729540>.

198. This policy has stood for many years despite Australia's position as one of the world's largest exporters of uranium for peaceful purposes.

199. *Australia Slides Down List of Uranium Exporters*, ABC NEWS (June 12, 2009), <http://www.abc.net.au/news/stories/2009/06/12/2596025.htm>.

200. Anne Marie Riha, *President Obama Announces Money for Nuclear Power Plant*, FOX NEWS (Feb. 16, 2010), <http://politics.blogs.foxnews.com/2010/02/16/president-obama-announces-money-nuclear-power-plant>.

201. On February 23, 2010, the Federal Resources and Energy Minister revealed that the proposed location of Australia's first national nuclear waste depository site is to be near Tennant Creek in the Northern Territory. See Jano Gibson & Kirsty Nancarrow, *Nuclear*

IV. POST-KYOTO NATIONAL EMISSION REDUCTION TARGETS, TAXES, AND OTHER MARKET-BASED INCENTIVES

In the absence of a global, legally binding agreement on reduction targets for GHG emissions, governments must reconsider their policy options. In the face of the current difficulties experienced by the United States and Australia in passing cap and trade legislation, fossil fuel industries are experiencing a reprieve. However, as governments are well aware, the industry sector is unlikely to reduce GHG emissions without some form of mandatory national reduction target. Governments should and will seek other ways apart from the cap and trade scheme to achieve the same objective. It is thus in the best interest of industry to be a step ahead of government regulation and to begin thinking of new ways of moving towards security, which ultimately lies in energy efficient technologies.

The Copenhagen summit and the recent controversy surrounding the working of the IPCC have not resulted in an overnight loss of global consensus on the need to mitigate anthropogenic climate change, nor have they undone the science behind climate change. They have undoubtedly led to decreased momentum in climate change mitigation efforts. Regardless, it would be folly for the industry sector to continue to rely on fossil fuels and other GHG emitting technologies to generate energy.

In the long term, the adverse effects of climate change will affect the public and lead to increased pressure on government and industry to find sustainable sources of energy. A recent survey in Australia indicates that despite the apparent loss of popularity of Rudd's CPRS, a majority of the public (84.3%) is still convinced that global climate change is real, and an equally high majority (82.6%) believes a plan should be adopted to reduce GHG emissions.²⁰² The survey concludes that there is broad agreement among political parties and the public on the need to substantially decrease GHG emissions by at least sixty percent by 2050 and market mechanisms should play the role in achieving these reductions.²⁰³ Thus, the debate currently centers on the details necessary to implement this objective.²⁰⁴ The survey indicates that even though government pressure on GHG emission reduction may reduce consumer preferences, it may eventually lead to a market-driven greening of industry, in which case it is in their interest to begin to make the switch.

Waste Likely to be Dumped in NT, ABC NEWS (Feb. 24, 2010), <http://www.abc.net.au/news/stories/2010/02/23/2827837.htm>.

202. Richard T. Carson et al., *Alternative Australian Climate Change Plans: The Public's Views*, 38 ENERGY POL'Y 902 (2010).

203. *Id.* at 909.

204. *Id.*

V. CONCLUSION

The success of an ETS in Australia, as pointed out by the Garnaut Review, depends upon the adoption of a global legally binding agreement in which the other major carbon producing economies are bound to GHG reduction targets. Either in the absence or presence of such an agreement, CPRS implementation in Australia would have limited effect on the global reduction of GHG emissions; despite high per capita carbon emissions, Australia's contribution to global totals is almost insignificant. Consequently, even if the five percent reduction target in the proposed CPRS is achieved, it would not result in a significant reduction of global carbon emissions in the absence of similar action by other major emitting countries such as the United States, China, and India. Following the outcome of the Copenhagen Conference, Australia may need to reconsider the effectiveness of legislating and implementing the CPRS.

Further, even at the national emissions level, the effectiveness of the proposed CPRS is not certain. As discussed in the foregoing sections, the success of an ETS in Australia is dependent on the existence of a larger global carbon market. In the absence of such a market, the cost to the economy of implementing an ETS would far outweigh its benefits.

Australia's other climate change policy priorities are CCS and other carbon abatement technologies. In addition to the risks and uncertainty discussed above, CCS and other carbon abatement technologies are not long-term solutions to the reduction of GHG emissions, particularly if they are implemented alongside CPRS. When such technologies engage in cleaning carbon, they reduce the price of coal and thus encourage Australia's reliance on coal. Further, the identification of CCS as a policy priority transfers funds that would otherwise be used for pursuing renewable energy options.

In the current circumstances, it would appear more effective for Australia to redirect the resources invested in CPRS and CCS to the development of renewable energy technologies. Despite the initial high cost associated with renewable energy, Australia has a natural advantage over other countries, particularly in the case of solar and wind sources. To stimulate the successful shift to renewable energy, the government may have to consider subsidies that are likely to encourage consumer demand for renewable energy and reduce generation costs.

The current government may also have to reconsider its policy options with respect to the use of nuclear energy. Nuclear energy would undoubtedly introduce the high risks associated with its use, although there is evidence from other countries that shows these risks can be managed and mitigated.

Given the present state of global governance with respect to climate change mitigation, total GHG emissions into the atmosphere are likely to continue to increase, or, in the best case, decrease by insignificant margins.

In such a situation, Australia should consider including climate change adaptation measures in its policy options.

The role of industry in the implementation of the above policy direction is essential. Apart from being the primary drivers of economic development, corporations have the financial and technological resources, as well as the institutional capacity, to implement policy options identified by government.²⁰⁵ The success of government policy options depends on the cooperation of industry and its quick response to government policy direction. Industry can facilitate the proposed government policy shift by ensuring that a skilled work force is available to support the required technological change.

It is in the interest of industry to consider a shift towards more renewable energy sources, which are likely to be the emphasis if GHG emissions continue at the current rates, as well as to identify business opportunities in climate change adaptation. Due to climate change awareness campaigns over the last few years, consumer trends indicate a greater demand for energy efficient products. Thus industries may be forced to move to energy efficient products to secure the consumer market.

ADDENDUM

2010 witnessed some extraordinary political events in Australia including a sitting Prime Minister, Kevin Rudd (elected in December 2007 with a solid parliamentary majority in the House of Representatives) removed from office on May 24, 2010, by his own Labour Party and replaced by Deputy Prime Minister, Julia Gillard. At a general election held on August 21, 2010, Labour and the Coalition Opposition each won 72 seats in the 150-seat House of Representatives resulting in the first hung parliament since the 1940s.²⁰⁶ Labour under Gillard formed a minority government and secured the support of the only Greens MP ever elected to the House of Representatives and three Independents. On July 1, 2011, the Greens will hold the balance of power in the 76-seat Senate with a total of nine seats.²⁰⁷ In the Senate, the Coalition will hold 34 seats to Labour's 31. An Independent and a newly elected Senator from Victoria will hold the two remaining Senate seats.

205. Helen Borland, *Conceptualising Global Strategic Sustainability and Corporate Transformational Change*, 26 INT'L MARKETING REV. 554 (2009).

206. The complete election results are available from the Australian Electoral Commission's website, <http://results.aec.gov.au/15508/Website/default.htm>

207. Under the Australian electoral system, senators are elected for six year terms that end on June 30. See *Elections: Constitutional complexities and consequences*, PARLIAMENT OF AUSTRALIA – SENATE (Sept. 21, 2007), <http://www.aph.gov.au/senate/pubs/elections/15626.htm>.

The results of the August 2010 election have significant implications on almost all major initiatives put forward by the Gillard minority government. One of the principal reasons leading to Rudd's political demise was his decision to withdraw the CPRS legislation from Parliament in April 2010 and postpone any further consideration of his twice-defeated CPRS until 2013, a position at the time endorsed and since re-affirmed by his successor, Julia Gillard.

Although she gave an undertaking on two occasions prior to the August 2010 election that there would be no "carbon tax" if elected, she has since reversed her position under pressure from the Greens and has now vowed to enact a carbon tax to take effect by July 1, 2012. The Opposition vociferously opposes this measure²⁰⁸

This will operate until 2015–2016 when the regime will move to an emissions trading scheme. Whether the Greens will decide whether or not to bring down the government and force early elections remains the subject of intense speculation because the Prime Minister has made it clear that compensation for energy-intensive industries, such as electricity generation, and trade-exposed industries, such as coal, cement, and aluminum, will be provided at levels that mirror what the Rudd government had offered and had been rejected by the Greens when they voted against the CPRS on the two earlier occasions when the Bills were before Parliament.²⁰⁹

Policy positions taken by all parties are subject to change as party leaders try to ensure that they are not caught off guard should the government fall and the country heads to an early election. Therefore, it is difficult in such a volatile political cauldron to intelligently comment on the extent to which current government policy on a host of issues under debate, including energy production, GHG reduction, and strategies to effectively confront climate change and climate variation, will successfully be transformed into legislation and, more importantly, successfully implemented.

208. *Gillard vows to pursue consensus*, THE AUSTRALIAN (Oct. 1, 2010, 12:00 AM), <http://www.theaustralian.com.au/national-affairs/gillard-vows-to-pursue-consensus/story-fn59niix-1225932572333>.

209. *Id.*