

AIMING HIGH: ON AUSTRALIA'S EMISSIONS REDUCTION TARGETS

PETER CHRISTOFF*

I INTRODUCTION

Considerable attention has been paid recently to the possible architecture of Australia's proposed emissions trading scheme, the Carbon Pollution Reduction Scheme ('CPRS'). By contrast, there has been little public consideration of the emissions caps that will apply to the Scheme and to Australia's medium (2020) and long term (2050) national emissions reduction targets. Yet these will ultimately determine whether or not Australia will contribute meaningfully to global attempts to avert the worst impacts of climate change.

This article considers problems confronting those seeking to set national emissions targets. The first is the gap between scientific and political understandings of the risks of climate change. The second is the complex relationship between international, national and sub-national political spheres. The third is the difficulty involved in linking targets to processes for their implementation. This paper has two parts. First, it considers the issue of the targets and goals that Australia should adopt. It reviews what recent climate science tells us about the risks and associated likely global and regional impacts of different atmospheric concentrations of greenhouse gases ('GHGs'). The paper argues that Australia's present long-term emissions target and the weak medium term targets suggested by the Garnaut Climate Change Review will not diminish the risk of dangerous climate change. In response, it proposes tougher targets that will enable Australia to play its part in reducing such a risk. The paper's second part then considers institutional reforms that may help achieve such targets. It specifically addresses the roles of complementary measures, and of the States, in achieving emissions reductions beyond those likely to be delivered by the CPRS alone.

* Faculty of Land and Environment, University of Melbourne. The author is also Vice President of the Australian Conservation Foundation and a member of the (Victorian) Premier's Climate Change Reference Group.

II EMISSIONS TARGETS, RISK AND CLIMATE SCIENCE

During late September 2008, US Treasury officials scrambled to shore up the American financial system during the most desperate and turbulent weeks for global markets since the Great Depression. In offering support for US Treasury Secretary Paulson's \$700 billion rescue plan, President Bush stated:

My first instinct was to let the market work until I realized, upon being briefed by the experts, of how significant this problem became ... This is a big package because it's a big problem. I will tell our citizens and continue to remind them that the risk of doing nothing far outweighs the risk of the package, and that, over time, we're going to get a lot of the money back.¹

There has been no commensurate response to the threat of global warming, which is arguably far more dangerous. Indeed, there is a growing chasm between what climate scientists tell us is required if we are to avoid catastrophic climate change, and what politicians and policy makers accept to be the task. It remains unclear why the 'clear and present' danger posed by climate change fails to attract commensurate attention and policy response.

Scientists increasingly believe that global warming of 2°C above pre-industrial levels significantly increases the chance of 'dangerous' climate change, during which abrupt and dramatic shifts in climate may occur, with catastrophic social, ecological and economic consequences.² So what should we aim for in terms of cutting emissions and stabilising the level of atmospheric GHGs?

The Intergovernmental Panel on Climate Change's ('IPCC') Fourth Assessment Report estimates that emissions reduction by developed nations of *between 25 per cent and 40 per cent below 1990 levels by 2020*, and reductions of *between 80 per cent and 95 per cent below 1990 levels by 2050*, would probably stabilise atmospheric concentrations of GHGs at around 450 ppm (parts per million) CO₂ equivalent (CO₂e) and likely lead to global average warming of between 2.0 and 2.4°C (Figure 1).

The IPCC infers that to stay *below* global warming of 2°C would require developed countries to cut their emissions by *more than 40 per cent* by 2020. However the IPCC did not consider long-term feed-back effects that would take warming to higher levels. It is also highly likely that the IPCC has underestimated the chance of tipping points emerging at this temperature, as suggested by scientific publications emerging since 2006. In addition, the IPCC relies on emissions modelling which was completed before 2001 and therefore could not incorporate data reflecting the unpredicted recent increase in global industrial emissions. Each of these factors makes its projections conservative. Reducing risk and future warming will require deeper, earlier cuts than those implied by the IPCC.

1 President George Bush, 'President Bush's remarks on the economy' (News Conference, 20 September 2008) <<http://www.federalnewsradio.com/?nid=78&pid=&sid=1481926&page=3>> at 26 September 2008.

2 Hans Joachim Schnellhuber et al (eds) *Avoiding Dangerous Climate Change* (2006).

Recent modelling³ suggests that atmospheric concentrations of GHGs at 450 ppm CO₂-e would result in roughly a 50/50 chance⁴ of global average warming exceeding 2°C above preindustrial levels. We are adding around 2.5 ppm CO₂-e to our atmosphere each year and, with industrialisation in China and India proceeding apace, that rate of accumulation has increased over the past decade. Without substantial and rapid cuts to global emissions, we will not only 'overshoot' 450 ppm CO₂-e, but remain well above this level for a long time, given the amount of time GHGs remain in the air.

Figure 1: Emissions allowances and concentration levels⁵

Box 13.7 The range of the difference between emissions in 1990 and emission allowances in 2020/2050 for various GHG concentration levels for Annex I and non-Annex I countries as a group^a

Scenario category	Region	2020	2050
A-450 ppm CO ₂ -eq ^b	Annex I	-25% to -40%	-80% to -95%
	Non-Annex I	Substantial deviation from baseline in Latin America, Middle East, East Asia and Centrally-Planned Asia	Substantial deviation from baseline in all regions
B-550 ppm CO ₂ -eq	Annex I	-10% to -30%	-40% to -90%
	Non-Annex I	Deviation from baseline in Latin America and Middle East, East Asia	Deviation from baseline in most regions, especially in Latin America and Middle East
C-650 ppm CO ₂ -eq	Annex I	0% to -25%	-30% to -80%
	Non-Annex I	Baseline	Deviation from baseline in Latin America and Middle East, East Asia

Notes:

^a The aggregate range is based on multiple approaches to apportion emissions between regions (contraction and convergence, multistage, Triptych and intensity targets, among others). Each approach makes different assumptions about the pathway, specific national efforts and other variables. Additional extreme cases – in which Annex I undertakes all reductions, or non-Annex I undertakes all reductions – are not included. The ranges presented here do not imply political feasibility, nor do the results reflect cost variances.

^b Only the studies aiming at stabilization at 450 ppm CO₂-eq assume a (temporary) overshoot of about 50 ppm (See Den Elzen and Meinshausen, 2006).

Source: See references listed in first paragraph of Section 13.3.3.3

By contrast, we improve our chances of keeping global mean temperature below 2°C only by ensuring atmospheric GHG concentrations rapidly return to below 400 ppm CO₂-e.⁶ (Even at 400 ppm CO₂-e, we only have between a 66 per cent and a 90 per cent chance of staying below the 2°C global warming 'threshold'.⁷)

3 See Malte Meinshausen, 'What does a 2°C target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates', Hans Joachim Schnellhuber et al (eds) *Avoiding Dangerous Climate Change* (2006) 265.

4 The models report a bandwidth of probability of between 30 per cent and 80 per cent chance.

5 Figure extracted from IPCC Working Group III, *Climate Change 2007* (2007) 776.

6 See Meinshausen, above n 3.

7 Malte Meinshausen, <2°C Trajectories – a Brief Background Note (2006) Kyoto Plus Papers 3 <http://www.kyotoplus.org/www2.kyotoplus.org/uploads/meinshausen_fin_rev.pdf> at 26 September 2008.

The risks and levels of extinction increase as global GHG levels – and temperatures – rise. Rapid warming beyond 2°C would be highly damaging for many ecosystems and species. The IPCC indicates that approximately 20 per cent to 30 per cent of land-based plant and animal species assessed so far are likely to be at increasingly high risk of extinction by 2100 as global mean temperatures exceed a warming of 2°C to 3°C,⁸ and up to half of all terrestrial species are threatened once temperatures rise well beyond 3°C.⁹ Moreover, many ecosystems and species appear at increased risk not only because of warming, but because of the increased range, frequency, intensity and duration of climatic extremes and extreme events (storms, fires, floods, etc).

However a globally averaged notion of ‘dangerous climate change’ has little meaning for those regions, ecosystems, and species that are sensitive to even slight temperature increases – including low-lying coasts and islands, coral reefs, alpine systems, and the polar caps. Accordingly, Steffen et al write that ‘dangerous climate change can best be defined from the perspective of the various systems or sectors that are impacted by a changing climate’.¹⁰

Australian studies¹¹ indicate that even 2°C is too high for certain Australian ecosystems and species. Warming of between 1°C and 1.5°C will lead to significant losses of core habitat for endemic plant, reptile, bird and animal species (and likely extinctions) in Queensland’s Wet Tropics; frequent bleaching episodes on the Great Barrier Reef and substantial losses and extinctions among its endemic coral and fish species; and a further loss of between 13 per cent and 27 per cent of flow in the Murray Darling by 2030. At 2°C, Australia’s food bowl – the Murray Darling Basin – would be in deeper crisis, the Great Barrier Reef largely lost, Kakadu, Daintree and the Alps significantly affected. At higher temperatures, Australian ecosystems would become profoundly degraded.¹²

These studies do not consider the effects of what may be described as low probability/high impact events which – like the present US financial crisis in relation to global credit markets – can radically reset the planet’s thermostat. Scientific consideration of the increasing likelihood of ‘abrupt climate change’ has begun to focus more intently on high impact events such as the rapid loss of Arctic sea ice and the alpine snow pack (the latter causing significant water shortages for human settlements), disintegration of the West Antarctic and

8 Andreas Fischlin et al ‘Ecosystems: their properties, goods and services’, in IPCC Working Group II *Climate Change 2007: Impacts, Adaptation and Vulnerability* (2007) 213.

9 Sir Nicholas Stern, *Stern Review on the Economics of Climate Change* (2006) HM Treasury 57 <http://www.hm-treasury.gov.uk/Independent_Reviews/stern_review_economics_climate_change/sternreview_index.cfm> at 18 September 2008.

10 Will Steffen, Geoff Love and Penny Whetton, ‘Approaches to Defining Dangerous Climate Change: An Australian Perspective’, in Hans Joachim Schnellhuber et al (eds) *Avoiding Dangerous Climate Change* (2006) 219.

11 For a summary of these studies, see Benjamin Preston and Roger Jones, ‘Climate Change Impacts on Australia and the Benefits of Early Action to Reduce Global Greenhouse Gas Emissions: A Consultancy Report for the Australian Business Roundtable on Climate Change’ (2006) CSIRO <<http://www.csiro.au/files/files/p6fy.pdf>> at 26 September 2008.

12 Ibid 22.

Greenland ice sheets, the melting of Alaskan and Siberian permafrost (resulting in the rapid release of methane and carbon dioxide), and the atmospheric impacts of wild fires in drought-stricken tropical forests.

Furthermore, most climate studies only report on the 'immediate' effects of global warming – up to 2100. This diminishes consideration of the catastrophic longer term impacts of even 'modest' global warming. *Current* atmospheric concentrations of GHGs will lead to the permanent loss of summer sea ice in the Arctic within five years – a loss that even three years ago was not expected to occur until the end of this century.¹³ However *current* levels also will cause the loss, over the next 200–1000 years, of much or all of Greenland's ice cover, leading to increases in sea level of some seven meters, consequent loss of highly valued cultural and natural coastal sites, and the displacement of hundreds of millions of people.

Climate scientist Professor James Hansen, Director of NASA's Goddard Institute of Space Studies explains:

based on current information, we now realise that we have passed or are on the verge of passing several tipping points that pose grave risks for humanity and especially for a large fraction of our fellow species on the planet. This information is gleaned primarily from the Earth's history and ongoing global observations of rapid climate changes, and to a lesser extent from climate models that help us interpret observed changes.¹⁴

Indeed, Hansen et al argue that global warming must be confined to 1°C to minimise the risk of permanently losing the planet's major ice sheets.¹⁵ In addition, Hansen et al contend that the doubling of preindustrial atmospheric GHG concentrations (560 ppm CO₂), while leading to 3°C warming or more by 2100, will result in much higher stabilised global temperatures of around 6°C once long-term feedbacks are taken into consideration.¹⁶ Consequently, and in response to available empirical data, Hansen has defined our greenhouse challenge by arguing that 'the safe level of carbon dioxide is no more than 350 ppm and it may be less' if we are to avoid the otherwise high likelihood of disastrous sea-level rises.¹⁷

There is a second line of argument that we also need to consider. The issue is not (simply) which *targets* we choose, but the emissions reduction pathways or *trajectories* we adopt. There are many ways of achieving a -60 per cent, -80 per cent or -95 per cent global emissions target, including by continuing to increase

13 See, eg. Will Steffen, *Stronger Evidence but New Challenges: Climate Change Science 2001–2005* (2006) Australian Government Department of Climate Change 23
<<http://www.climatechange.gov.au/science/publications/pubs/science2001-05.pdf>> at 26 September 2008.

14 James Hansen, 'Open letter to PM Kevin Rudd', dated 27th March 2008.
<http://www.columbia.edu/~jeh1/mailings/20080401_DearPrimeMinisterRudd.pdf> at 26 September 2008.

15 James Hansen et al, 'Dangerous human-made interference with climate: a GISS modelE study' (2007) 7 *Atmospheric Chemistry and Physics* 2287.

16 James Hansen et al, 'Target atmospheric CO₂: Where should humanity aim?' (2008)
<<http://arxiv.org/abs/0804.1126>> at 26 September 2008.

17 *Ibid.*

emissions for some time before bringing them down sharply much later. This is the trajectory that many still believe can or should be followed, even though it produces a larger volume of gases before the ultimate target is met than an alternative path of early, deep cuts and then additional graduated decline.

As Sir Nicholas Stern recently noted, 'it is the *stock* of atmospheric GHGs, measured in terms of atmospheric concentrations, that causes the rise in global temperatures and changes in climate'.¹⁸ We should be as – indeed perhaps *more* – worried about the cumulative increase in the *stocks* of atmospheric GHGs than about targets alone, given the longevity of these gases. All of this suggests that Australia should aim for early and deep cuts in emissions, with significant reductions proposed for the period to 2020.

Finally, the emphasis should be – as it now is with US finance markets – on risk minimisation rather than on targets per se. To minimise loss, we are eager to spend significantly to insure our houses against a much slighter risk of theft and the risk of accidental fire or accident. Planes and nuclear reactors are designed to a very high level of mechanical safety (around 1:100,000 years for the latter) – again, because of concerns about the small risk of catastrophic failure. Most industrialised countries, including Australia, spend heavily on health and defence to ensure they have substantial capacity to further minimise already slight risks of pandemics and invasion. Yet in the realm of climate change, Australian politicians and policy makers appear prepared to accept a much higher level of risk of catastrophic failure.

III WHEN CLIMATE SCIENCE MEETS CLIMATE POLITICS

The purpose of the *United Nations Framework Convention on Climate Change*¹⁹ is the

stabilisation of GHG concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Such a level should be achieved within a time frame sufficient to allow ecosystems to adapt naturally to climate change, to ensure that food production is not threatened and to enable economic development to proceed in a sustainable manner.²⁰

Article 3.1 of the Convention states that Parties

should protect the climate system for the benefit of present and future generations of humankind, on the basis of equity and in accordance with their common but differentiated responsibilities and respective capabilities. Accordingly, the developed country Parties should take the lead in combating climate change and the adverse effects thereof.²¹

18 Nicholas Stern, *Key Elements of a Global Deal on Climate Change* (2008) London School of Economics and Politics 9
<http://www.lse.ac.uk/collections/granthamInstitute/publications/KeyElementsOfAGlobalDeal_30Apr08.pdf> at 26 September 2008 (emphasis added).

19 Opened for signature 4 June 1992, 1771 UNTS 107 (entered into force 21 March 1994) ('UNFCCC').

20 UNFCCC, opened for signature 4 June 1992, 1771 UNTS 107, art 2 (entered into force 21 March 1994).

21 UNFCCC, opened for signature 4 June 1992, 1771 UNTS 107, art 3.1 (entered into force 21 March 1994).

In ratifying the *UNFCCC*, developed countries like Australia also accepted the need for an additional emissions reduction burden that reflects their disproportionate historical contribution to the global warming problem. This is suggested in the IPCC's view, indicated above, that the emissions of Annex 1 countries need to be reduced 'disproportionately', by between 80 per cent and 95 per cent below 1990 levels by 2050, if global GHG concentrations are to be confined to 450 ppm.

In May 2007, Peter Garrett, then Shadow Environment Minister, announced that Labor would aim for a longer term emissions reduction target of 60 per cent below 2000 levels by 2050.²² Numerous Labor dignitaries have supported this goal and affirmed that it 'comes from the science'.²³ In fact, Labor's target mirrors the United Kingdom Government's commitment to an identical goal, supported by draft national legislation – the United Kingdom Climate Change Bill, which was widely seen in 2007 as the best international example of such law.²⁴ The UK Bill's 60 per cent target was adopted based on the recommendation of the Royal Commission on Environmental Pollution, made in its outdated June 2000 report, *Energy - The Changing Environment*.²⁵ However, on the available current scientific evidence, such a target – adopted internationally – would deliver global average warming of above 3°C and catastrophic ecological and social outcomes for Australia.

The 60 per cent target is therefore likely to see Australia breach its obligations under Articles 2 and 3.1 of the *UNFCCC*. It will likely also cause Australia to breach its commitments under a number of other treaties, including the *Convention Concerning the Protection of World Cultural and Natural Heritage*,²⁶ the *Convention on Biological Diversity*,²⁷ the *Convention on Wetlands of International Importance, especially as Waterfowl Habitat*,²⁸ various

22 Peter Garrett, 'Labor's Greenhouse Reduction Target – 60% by 2050 Backed By the Science' (Media Release, 2 May 2007) <<http://www.alp.org.au/media/0507/msCC020.php>> at 26 September 2008.

23 Ibid; Interview with Wayne Swan, 'Economy, Emissions Reduction Target', ABC 7.30 Report, 8 June 2007; Kevin Rudd 'Rudd on the Green Offensive' Australian Broadcasting Corporation Broadcast, 30 October 2007; Penny Wong, 'Climate change, Professor Garnaut's Report', Transcript of doorstep interview, Canberra, 5 September 2008 <<http://www.environment.gov.au/minister/wong/2008/tr20080905.html>> at 26 September 2008.

24 On 23 September 2008, British Prime Minister Gordon Brown called to increase the targeted cut in CO₂ emissions from 60 per cent to 80 per cent below 1990 levels by 2050, and has asked his independent Committee on Climate Change to analyse the feasibility of this goal 'to avert catastrophic climate change'. <<http://www.telegraph.co.uk/earth/main.jhtml?xml=/earth/2008/09/23/eaco2123.xml>> at 2 October 2008.

25 Royal Commission on Environmental Pollution, 22nd Report - *Energy - The Changing Environment* (2000) Cm 4794 <<http://www.rcep.org.uk/newenergy.htm>> at 2 October 2008.

26 Opened for signature 23 November 1972, 1037 UNTS 151 (entered into force 15 December 1975).

27 *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79, art 4 (entered into force 29 December 1993)

28 Opened for signature 2 February 2001, 996 UNTS 245 (entered into force 21 December 1975) ('*Ramsar Convention*').

bilateral agreements to preserve habitat for migratory birds²⁹, which require Australia to do all it can to protect listed sites (including the Great Barrier Reef, Shark Bay, Fraser Island, the wet tropics of Queensland, and Kakadu National Park) and listed endangered species.³⁰

It seems that senior Australian politicians and policy makers have misunderstood or failed to accept their responsibilities to the environment, or to present and future generations, under the *UNFCCC*. Their undiminished support³¹ for a graduated approach to a distant end goal is based on the mistaken belief that the 60 per cent emissions target is both powerful and adequate, as well as on their hope that a soft target will increase predictability for future investment (particularly in the energy sector), reduce sharp impacts on current populations and reduce climate threats. Meanwhile leading Australian climate scientists are increasingly emphatic about the need for Australia to adopt early and deep emissions cuts to avert dangerous climate change, recently calling on the PM to adopt ‘an emission reduction target for Australia of 25 per cent below 1990 levels by 2020’.³²

Australian debate about specific targets (mainly over long-term national emissions targets, as occurred during the 2007 federal election³³) has masked or deferred a necessary prior debate about the *purpose* of these targets – about what our goals should be. This is a critical discussion that the public should understand and in which it should be included. Instead, for the last decade and a half, the debate about climate change has been captured by a narrow discourse. This discourse has reduced the key questions for consideration to: *How much will it cost?* and *How will it affect us NOW?* (defined in terms of present dollar impacts). These terms of debate were framed by Prime Minister John Howard as being in ‘the national interest’.

The targets we argue for should depend on answering two prior questions.

- What will we accept as ‘safe’ for our planet, and our continent, and our immediate lives – what do we want to pass on to our children and future generations?
- What are the likely *risks* and ecological and social *consequences* of adopting particular targets?

Having defined what we *want*, and with an understanding of the *risks and consequences* of different targets, we are *then* in a position to determine which

29 See, eg. *Japan Australia Migratory Birds Agreement*, opened for signature 6 February 1984, ATS 1981 No 6 (entered into force 30 April 1981) and *China Australia Migratory Birds Agreement*, opened for signature 20 October 1986, ATS 1988 No 22 (entered into force 1 September 1988).

30 See for instance, Articles 4 and 5 of the *World Heritage Convention*; and Articles 3, 6 and 8(d) and 8(l) of the *Convention on Biodiversity*.

31 See, eg. Wong, above n 23.

32 Nathan Bindoff et al. *Open Letter to the Prime Minister of Australia* <<http://www.science.unsw.edu.au/ruddlette>> See also Marian Wilkinson and Adam Morton, ‘Scientists urge PM: get tougher on climate’, *The Age*, 29 September 2008.

33 See, for instance, Perry, M. ‘Global Warming overheats Australian politics’, Reuters, 4 June 2007; Rudd, ‘Rudd on the Green Offensive’, above n 23.

target we will support. The targets we adopt and implement should reflect what we as Australians choose to regard as unacceptable – or ‘dangerous’ – climate outcomes. The risks – and associated risk-minimising targets – Australians should champion internationally should be – to recapture and recycle Howard’s infamously misused term – what we regard as being ‘in the national [ecological] interest’.

It is this understanding of purposes, risks and consequences that is still lacking in the present debate. As a result, an Australian contribution to achieving a 450 ppm CO₂-e stabilisation target – which will deliver a high risk of runaway climate change and associated unacceptable impacts – is still seen as an ambitious and, by some, unachievable policy target.

A The Garnaut Moment

Immediately following Labor’s victory in November 2007 and as his first act in government, Prime Minister Rudd ratified the *Kyoto Protocol*³⁴ on Australia’s behalf. Days later, he was feted at the 13th Conference of the Parties (‘COP’) to the *UNFCCC* at Bali. Australia had joined at a critical time in climate negotiations, when Parties to the Convention and Protocol were seeking to establish a new timetable and framework to determine targets for the Protocol’s second commitment period (2013–2020).

Almost immediately, Australia was called on to endorse the IPCC’s view that developed nations (specifically, countries listed in Annex 1 of the *UNFCCC*) would need to reduce their emissions by between 25 per cent and 40 per cent below 1990 levels by 2020 if there is to be a significant chance of stabilising global warming at 2°C or below. This endorsement was critical: it would help frame the bandwidth of targets for industrialised countries during the next commitment period.

The Australian delegation balked and newly appointed Minister for Climate Change, Penny Wong, initially did so as well. She emphasised that the Garnaut Climate Change Review³⁵ would recommend on targets in 2008, leading Greens Senator Christine Milne to quip that we were now all trapped in an absurdist play called ‘Waiting for Garnaut’.³⁶ Only during the tense closing moments of the final day of negotiations at Bali, did Australia finally endorse the declaration which indicated the commitment of the developed countries bloc (*sans* the United States) to pursue targets within this bandwidth.³⁷

Professor Ross Garnaut attended the Bali conference and was aware of these debates and of the importance of the Ad Hoc Group’s commitment. It was

34 *Kyoto Protocol to the United Nations Framework Convention on Climate Change*, opened for signature 16 March 1998, 37 ILM 22 (entered into force 16 February 2005) (‘*Kyoto Protocol*’).

35 The Garnaut Climate Change Review was established in April 2007 by the eight Labor State and Territory governments, and was headed by Professor Ross Garnaut.

36 Christine Milne, ‘Waiting for Garnaut, end Act 1’, *Crikey*, 14 December 2007 <<http://www.crikey.com.au/Politics/20071214-Waiting-for-Garnaut-end-Act-1.html>> at 26 September 2008.

37 Peter Christoff, ‘The Bali Roadmap and Beyond’ (2008) 93 *Arena Magazine* 32.

against this larger background that he launched his Supplementary Draft Report on *Targets and Trajectories*³⁸ at the National Press Club in Canberra on 5 September this year, with a speech that revealed his deep pessimism about the likelihood of effective global emissions cuts being negotiated for the second commitment period of the Kyoto Protocol.

Garnaut tailored his recommendations accordingly.³⁹ He emphasised that ‘Australia’s target... should be to reduce emissions by 10 per cent from 2000 levels by 2020... and 80 per cent by 2050... conditional on, an effective global agreement that is designed to stabilise global concentrations of GHGs by 550 ppm by mid-century.’⁴⁰ Furthermore, ‘in the absence of comprehensive agreement on global GHG emissions reductions.. Australia, as one of the developed countries, should commit to reducing emissions from 2000 levels by 5 per cent ... by 2020.’⁴¹

Only if global agreement for a 450 ppm target was achieved, should Australia adopt such a trajectory, and emissions reductions of 25 per cent below 2000 levels by 2020 and 90 percent below by 2050. The gulf between the weaker targets – which if adopted internationally would lead to global warming well in excess of 3°C by the end of this century – and those identified as necessary by climate scientists is profound, and the shortfall between his recommendations and those ‘noted’ in the Bali text is substantial. Unsurprisingly, Garnaut’s targets were savaged in the media as grossly environmentally inadequate.⁴²

The Final Report⁴³, released at the end of September 2008, still proposed three markedly different options for Australian targets, each dependent on the success of negotiations at Copenhagen in 2009.⁴⁴ But Garnaut’s emphasis had shifted slightly. It is worth quoting the critical passage in full:

38 Garnaut Climate Change Review, *Targets and Trajectories – Supplementary Draft Report: September 2008* (2008) 7 <<http://www.garnautreport.org.au/reports/Garnaut%20Review%20-%20Targets%20and%20trajectories%20-%20Supplementary%20Draft%20Report%20-%205%20Sept%202008.pdf>> at 14 September 2008 (*‘Targets and Trajectories’*).

39 Garnaut explained his views in a letter responding to his critics but failed to account for the Bali agreement. See *Letter from Professor Garnaut to Scientists and Environment Groups* (2008) <[http://www.garnautreview.org.au/CA25734E0016A131/WebObj/LetterfromProfessorGarnauttoscientist sandenvironmentgroups%20sept08/\\$File/Letter%20from%20Professor%20Garnaut%20to%20scientists%20 and%20environment%20groups%20sept08.pdf](http://www.garnautreview.org.au/CA25734E0016A131/WebObj/LetterfromProfessorGarnauttoscientist sandenvironmentgroups%20sept08/$File/Letter%20from%20Professor%20Garnaut%20to%20scientists%20 and%20environment%20groups%20sept08.pdf)> at 26 September 2008.

40 Ross Garnaut, ‘Targets and Trajectories’ (Speech Delivered at the National Press Club, Canberra, 5 September 2008).

41 Ibid.

42 See, eg, Phillip Coorey, ‘Green Groups Slam Failure to Set Firm Targets’, *Sydney Morning Herald* (Sydney), 6 September 2008, 6; Adam Morton ‘Garnaut is Wrong, Say Scientists’ *The Age* (Melbourne) 9 September 2008; Editorial, ‘Soft option on climate means opting for defeat’, *The Age* (Melbourne), 10 September 2008.

43 Ross Garnaut, *Garnaut Climate Change Review: Final Report* (2008) <[http://www.garnautreport.org.au/reports/Garnaut%20Climate%20Change%20Review%20-%20Final%20Report%20-%2030%20September%202008%20\(Full%20version\).pdf](http://www.garnautreport.org.au/reports/Garnaut%20Climate%20Change%20Review%20-%20Final%20Report%20-%2030%20September%202008%20(Full%20version).pdf)> at 2 October 2008.

44 Ibid 283.

The Review confirms its recommendation in the supplementary draft report – that Australia should offer to play its full, proportionate part in a global agreement designed to achieve 450 ppm with overshooting. It should offer to reduce its emissions entitlements in 2020 by 25 per cent within an effective global agreement that, on realistic assessment, adds up to the 450 ppm ... scenario.⁴⁵

The emphasis had moved to the 450 ppm goal, but the position remained 'conditional'. Garnaut supports Australian cuts of 25 percent below 2000 levels by 2020 within a global agreement aimed at returning emissions to 450 ppm. However Australia should adopt a 10 per cent reduction from 2000 levels by 2020 within a global agreement aimed at stabilising emissions at 550 ppm. In the event of no agreement being reached, Australia should adopt a 5 per cent reduction below 2000 levels by 2020. In all this, it remains unclear whether his 'global agreement'⁴⁶ must include India and China – which is highly improbable – or what his alternative 'ad hoc world' entails.

What is clear is that an internationally adopted target of -10 per cent would establish a trajectory toward stabilisation of global atmospheric GHG concentrations at or above 550 ppm, and average temperature increase in excess of 3°C. This, Garnaut still claims, is a 'first step', 'a staging platform for more aggressive reductions at a later date'⁴⁷ and 'far reaching enough to keep open the possibility of avoiding high risks of dangerous climate change'.⁴⁸

Yet, elsewhere, the Draft Report, the Supplementary Report on Targets, and the Final Report agree that this would spell disaster for Australia. The Final Report clearly describes the vulnerability of Australian environments, where average warming of 1–1.5°C is already 'dangerous' climate change. The Supplementary Report notes succinctly that:

There are large risks to the Australian economy, and to Australian values manifested outside market processes, if the concentrations of carbon dioxide equivalent in the atmosphere reach 550 ppm and stay there.⁴⁹

It indicates⁵⁰ that, with stabilisation at 450 ppm, by 2100:

- between 5 and 23 per cent of species would be at risk of extinction;
- there would be a 6–54 per cent likelihood of irreversible melting of the Greenland ice sheet (thereby raising sea levels by some seven metres); and
- up to 79 per cent of coral species would face extinction

At 550 ppm, the level of risk increases to:

- between 8 and 39 per cent of species at risk of extinction

45 Garnaut, *Final Report*, above n 43, Ch 12; Garnaut Climate Change Review, *Targets and Trajectories*, above n 38, 279.

46 Ibid 281.

47 Ibid 279.

48 Garnaut Climate Change Review, *Targets and Trajectories*, above n 38, 9.

49 Ibid 3.

50 Ibid 33, Table 8.2. Data based on a survey of recent scientific literature undertaken for the Garnaut Review.

- between 12 and 77 per cent chance of losing the Greenland ice sheet; and
- between 44 and 87 per cent of coral species would face extinction.⁵¹

Above 2°C, Australia's food bowl – the Murray Darling Basin – would be in deeper crisis, Australia's tourism industry would face exceptional difficulties, and our cities greater water shortages. Without strong mitigation, the melting of the Greenland ice sheet and significant sea level rise 'sooner or later become close to a sure thing'. The costs of these impacts – many of which cannot be calculated in monetary terms – are great and 'will be much more costly in the next century'.⁵² Further, the Supplementary Report notes,

as important as these differential non-market impacts are, perhaps the decisive advantage of the 450 strategy over the 550 strategy is its insurance value. While neither the 450 nor the 550 strategy would eliminate climate change risks, the 550 strategy would leave the world and Australia, open to larger risks of exceeding threshold temperature values, even if these 'tipping points' cannot be known in advance with certainty.⁵³

Meanwhile the Final Report emphasises that the cost of early and effective action is miniscule. In terms of GDP foregone, the difference between Australia immediately adopting a 450 ppm target and emissions reduction trajectory over a 550 ppm one is 0.1 per cent of GDP per annum *foregone*.⁵⁴ In this light, the Review's failure to model or consider a 400 ppm, or even a 350 ppm, target is serious. This must be done before commitments are made to medium term targets.

In sum, the Garnaut Review's position on targets in the Supplementary and Final Reports embodies the tension between scientific assessments of risk and impact, and policy and political assessments that cloud and diminish understanding of the import of those scientific views. Garnaut shows in great detail that the stakes for Australia are very high, yet ultimately sets his sights very low, yielding to pessimism and ignoring the momentum that can be created by proactive leadership, investment, education and powerful advocacy. For all its many strengths, the Final Report fails to advocate a path and targets that would clearly define Australian leadership on the climate target issue, or – more importantly – champion a target that would minimise the risk of catastrophic climate change for Australian ecological, social and economic systems.

To do this and also to reduce the social, economic and ecological costs of delay, Australia's medium-term (2020) target would need to be significantly greater than 25 per cent below 1990 levels by 2020, with its long-term target between 90 and 95 per cent below 1990 levels by 2050.

51 See also Garnaut, *Final Report*, above n 43, Ch 6: 'Climate change impacts on Australia'

52 Garnaut Climate Change Review, *Targets and Trajectories*, above n 38, 33.

53 Ibid 39.

54 Garnaut, *Final Report*, above n 43, Figure 11.7, 268. See also Figure 11.6, 267. Note – GNP foregone is not a material loss but a measure of future economic growth not realised.

IV GAPS, CAPS AND OTHER MEASURES

The task of setting Australia's national emissions targets is made difficult by the lack of widespread public understanding of the implications of certain choices, coupled with the fact that the scientific projections themselves embody risks and uncertainty about timing and impact that seem too 'distant' and less important than the more immediate political and economic risks, pressures and costs. It is further complicated by the way in which target-setting occurs in a nested set of processes occurring in related political spheres – national and international.

Labor has committed itself to 'providing a firm indication on interim national targets and trajectories by the end of this year'⁵⁵ in its climate White Paper, taking into account work being undertaken by the Treasury and the recommendations of the Garnaut Climate Change Review. The 'firm indication' of this initial target – or target range – precedes the international negotiations at the 15th COP in Copenhagen at the end of 2009, which will determine binding emissions targets for the *Kyoto Protocol's* second commitment period (extending from 2013 to 2020).

The Government currently believes that emissions reductions from 108 per cent above 1990 levels⁵⁶ to 25 per cent below are economically (and therefore politically) difficult to achieve by 2020. It is more likely, therefore, to adopt Garnaut's weaker target recommendations and announce a medium-term (2020) target of 5 or 10 per cent below 2000 levels in its White Paper in December 2008.

Such an outcome would constrain Senator Wong at the climate talks in Copenhagen, leaving Australia to campaign internationally for a target well below that expected of industrialised countries as per the Bali agreement.

The CPRS *Green Paper* offers a potential escape route, suggesting that Australia could adopt a tougher 'international' national target than its 'domestic' national one, and bridge the emissions reduction gap by buying permits through the Clean Development Mechanism. This would be both expensive and would breach the spirit of the *Kyoto Protocol's* thinking on 'supplementarity'.

How then, might tougher medium-term national targets - of 25 percent or greater - be met? There is a general belief and political hope that the CPRS will accomplish almost everything required to meet future targets. Labor sees the CPRS as being the predominant measure for achieving the national target and as 'the primary means by which the Government will seek to meet its international

55 Australian Government Department of Climate Change, *Carbon Pollution Reduction Scheme Green Paper* (2008) 170 <<http://www.climatechange.gov.au/greenpaper/report/pubs/greenpaper.pdf>> at 26 September 2008 ('*Green Paper*').

56 It is believed that Australia will meet its first commitment period *Kyoto* target of +108 above 1990 levels with relative ease, given the 'bonus' of the 'Australia clause' (*Kyoto Protocol* art 3.7) which allows Australia to credit emissions reductions associated with diminished land use and land clearing when calculating its total emissions.

obligations'.⁵⁷ This hope is possibly misplaced, and expectations of the Scheme unrealistically high, especially if the burden of emissions reduction becomes greater and more immediate.

Coverage of the Scheme will include stationary energy (50 per cent of total national emissions); transport (14 per cent); fugitive emissions (6 per cent); industrial processes (5 per cent); and waste (3 per cent) – a total of 78 per cent of total emissions.⁵⁸ Agriculture (16 per cent) may be included in 2015, if its specific and complex monitoring and compliance issues can be resolved. Initially therefore – and perhaps for some time – there will be a gap in cover of almost 20 per cent of total national emissions that falls outside the ambit of the CPRS. Further, as the *Green Paper* notes, 'while ... the Carbon Pollution Reduction Scheme has less than 100 per cent coverage of national emissions, there will be a difference between the national emissions trajectory and the scheme caps'.⁵⁹

Several questions arise. How will action in the 'uncovered' and the 'covered' sectors be harmonised to ensure that the national emissions target is met, and what measures other than the CPRS are required to ensure effective outcomes? And how will national targets be implemented – what is required to do so effectively at the sub-national (State) level?

Recent studies⁶⁰ indicate that the impact of emissions prices on transferred costs and energy consumption is likely to be slight while carbon prices remain low. In addition, the *Green Paper* itself summarises instances of market failure with respect to energy efficiency, including information barriers, bounded rationality, split incentives and lack of access to capital markets.⁶¹ These will occur within as well as outside the 'covered sectors' and require additional regulatory intervention – including clearly defined targets – and programs of material support, especially during the early years of the Scheme. Therefore the role of complementary measures targeting both 'covered' and 'uncovered' sectors is of some importance.

By way of example, improvements in energy efficiency have been identified as among the lowest hanging fruit for climate mitigation in Australia as Australia's energy efficiency performance has been relatively poor over the past few decades and lags well behind comparable Organisation for Economic Cooperation and Development countries. The CPRS *Green Paper* acknowledges that the area of energy efficiency has the 'potential to deliver a significant quantity of emissions reductions in Australia over the period ahead'.⁶² Importantly, McKinsey & Company found that a national emissions reduction

57 Ibid 170.

58 Australian Government Department of Climate Change, *National Greenhouse Gas Inventory 2006: Accounting for the Kyoto Target* (2006) <<http://www.climatechange.gov.au/inventory/2006/pubs/inventory2006.pdf>> at 26 September 2008.

59 *Green Paper*, above n 55, 170.

60 See, Allen Consulting Group, *Potential Mandatory Energy Efficiency Investment Requirements: Cost Benefit Analysis of Program Options* (2008).

61 *Green Paper*, above n 55, 285.

62 Ibid 284.

target of 30 per cent below 1990 levels by 2020 is easily achievable and that 25 per cent of these cuts could be derived from 'negative-cost' measures, namely energy efficiency actions relating to buildings and appliances.⁶³

Meanwhile the Centre of International Economics has emphasised that energy used by buildings is one of the 'big ticket items' in terms of GHG reduction potential, with energy demanded by buildings responsible for almost a quarter (23 per cent) of Australia's total GHG emissions.⁶⁴ However, energy efficiency is relatively immune to energy price increases of the sort to be delivered by the CPRS in the short to medium-term.⁶⁵ Potential gains here are cost-effective, significant and can be achieved quickly using effective regulation that is complementary to the effects of the CPRS, and also market-related measures such as direct subsidies and taxation incentives to drive mitigation-related innovation and change. It is notable that complementary energy efficiency programs have been initiated by several States.⁶⁶ Such an approach is not surprising given the historical responsibility and established bureaucratic capacity of States for energy resource development. State and local government responsibility for building and planning laws and regulations give exceptional power and capacity to these spheres of government for the implementation of complementary mitigation (and adaptation) measures.

Finally, the successful European experience with feed-in tariffs and mandatory renewable energy targets, which has propelled the uptake of renewable energy technologies and power and created employment in related sectors, suggests that complementary measures in this area ensure a more effective transition to renewable energy sources than would occur if the transition was left purely to the market. These measures are a confirmed part of the Australian scene at least until 2020 – including through a mandated national Renewable Energy Target of 20

63 McKinsey & Company, *An Australian Cost Curve for Greenhouse Gas Reduction* (2008) 6 <http://www.mckinsey.com/clientservice/ccsi/pdf/Australian_Cost_Curve_for_GHG_Reduction.pdf> at 26 September 2008.

64 Centre for International Economics, *Capitalising on the building sector's potential to lessen the costs of a broad based GHG emissions cut* (2007) 12 <http://www.theicie.com.au/content/publications/Building_sector's_potential_Sept13.pdf> at 2 October 2008.

65 Allen Consulting Group write that 'In the absence of complementary measures, energy efficiency investment behaviour can be expected to exhibit similar inertia': Allen Consulting Group, *Potential Mandatory Energy Efficiency Investment Requirements: Cost Benefit Analysis of Program Options – Report to the WA Office of Energy, April 2008* (2008) viii <<http://www.sedo.energy.wa.gov.au/pdf/CBA%20Potential%20Mandatory%20Energy%20Efficiency%20Requirements%20for%20Industry.pdf>> at 2 October 2008.

66 See, eg, *Victorian Energy Efficiency Target Act 2007* (Vic) ('VEET Act') and *Environment Protection (Environment and Resource Efficiency Plans) Regulations 2007* (Vic) made under the authority of the *Environment Protection Act 1970* (Vic), enabling the Victorian EPA to require businesses to prepare and implement an Environment and Resource Efficiency Plan (EREP).

per cent by 2020,⁶⁷ various State-based targets⁶⁸ and State-based feed-in tariffs schemes (in Victoria and South Australia). Despite criticism from the Productivity Commission and the Garnaut Review that the renewable energy target approach will not lead to additional emissions reduction in the capped stationary energy sector, and may impose additional costs on consumers, it is more likely that such regulatory requirements will drive infrastructure investment more smoothly towards a low emissions trajectory than would 'pure market' alternatives.

V STATES AND TARGETS

It may be suggested therefore that an argument exists for retaining and strengthening complementary measures, and establishing aspirational emissions targets and reduction trajectories, for both 'covered' and 'uncovered' sectors, rather than operating with a hope that the performance of these sectors and their component industries will automatically and harmoniously complement each other under the CPRS. This observation could be strengthened if, as is expected, the initial caps for covered sectors will be lightened to enable a soft start to the CPRS and some of the burden of emissions reduction is possibly transferred to the uncovered sectors. Setting such sectoral trajectories would be greatly assisted by having appropriate institutions and processes to develop understanding and agreement among stakeholders about the best paths for implementation. The corporatist model of roundtable-style working groups used for the Ecologically Sustainable Development Strategy is worth revisiting in this context.

There is also merit in individual States developing their own aspirational medium and long-term emissions targets and trajectories, to guide their actions and reflect their responsibilities and capacities in the context of the aggregate national target. Such an approach has been undertaken in South Australia.⁶⁹ It is under consideration in Victoria, potentially as part of a Victorian Climate Change Bill – a Labor electoral commitment made in 2006.

There are several arguments in support of such a complementary State-level approach, even where national targets and measures are defined in law. First, the Commonwealth has two paths it can take to achieve its targets. Under its external affairs powers, it can employ any measures required to achieve goals agreed under the *UNFCCC*. Or, relying on the institutions of cooperative federalism, it

67 Kevin Rudd, Peter Garrett and Chris Evans, *Labor's 2020 Target for a Renewable Energy Future: Election 07 Policy Document* (2007) <http://www.alp.org.au/download/now/renewable_energy_target_policy.pdf> at 26 September 2008; see also, 'Rudd announces mandatory renewable energy target', *ABC News*, 30 October 2007 <<http://www.abc.net.au/news/stories/2007/10/30/2076058.htm>> at 26 September 2008.

68 In July 2008, COAG proposed the merger of State-based renewable energy targets with the national scheme, under amended national legislation. See: COAG Working Group on Climate and Water, *Design Options for the Expanded National Renewable Energy Target Scheme* (2008) <<http://www.climatechange.gov.au/renewabletarget/consultation/pubs/ret-designoptions.pdf>> at 26 September 2008.

69 See *Climate Change and Greenhouse Emissions Reduction Act 2007* (SA) adopted on June 20, 2007.

can choose to negotiate with the States to establish complementary legislation at both levels and coordinate implementation through accredited State agencies. Each path has its dangers. Commonwealth legislative intervention brings with it the danger of being governed by one weak national target, and poor administrative and compliance capacities to ensure goals are achieved. The path of 'cooperative federalism' is beset by the potential for endless negotiation and delayed action. The problem is one of how to establish a 'virtuous competition' which would see States and Commonwealth 'bidding up' their targets and outcomes, rather than a 'race to the bottom'.

On balance, the most efficient and effective outcome is likely to lie with the cooperative federalist path. While the Commonwealth could seek to legislate to ensure that 'uncovered' sectors will contribute to national targets, it is unlikely to do so as this path would be politically difficult, and brings with it significant compliance issues of its own. National targets that exceed the CPRS would be better supported by legislative arrangements at the State level, especially given that the States have administrative responsibility for the CPRS's 'uncovered' sectors. The States could simultaneously define targets for these uncovered sectors (as well as more ambitious targets for covered sectors) and have the administrative capacity to encourage and ensure compliance with State as well as national targets.

Second, while the CPRS caps remain 'lighter' than national targets require, the role of the States in mitigation is enhanced – particularly in the 'uncovered' sectors but also in the 'covered' sectors, where complementary measures would enhance the effects of the ETS and compensate for its deficiencies. While the displacement of State-based complementary measures relating to the uptake of renewable energy by unified national measures *may* be a more efficient means of inducing a uniform transition away from a high-carbon energy sector, the States' capacity to assist and regulate change in their built environments is a critical component of such a change to which the Commonwealth can only be a secondary contributor.

Third, State-based targets would ensure States mobilise and contribute meaningfully to a national outcome, employing capacities in resource management and regulation that are unavailable to the national government. In all, as Victoria has argued in its responses to the CPRS *Green Paper*, 'coordinated, comprehensive and efficient action to address climate change is needed with the Commonwealth, the States and Territories and Local Government each having a clear role to play'.⁷⁰

Finally, while the CPRS will operate at a national level in relation to its covered sectors, it is presently unclear how the burden of emissions reduction

70 Victorian Government, *Victorian Government Submission to the Carbon Pollution Reduction Scheme Green Paper* (2008) <[http://www.dpc.vic.gov.au/CA256D800027B102/Lookup/VictorianGovernmentResponsetoCPRS/\\$file/Victorian%20Government%20Submission%20on%20the%20Carbon%20Pollution%20Reduction%20Scheme%20Green%20Paper.pdf](http://www.dpc.vic.gov.au/CA256D800027B102/Lookup/VictorianGovernmentResponsetoCPRS/$file/Victorian%20Government%20Submission%20on%20the%20Carbon%20Pollution%20Reduction%20Scheme%20Green%20Paper.pdf)> at 26 September 2008.

will fall – sector by sector, and State by State.⁷¹ It is acknowledged in the *Green Paper* that certain regions and low income households will be disproportionately affected by the Scheme and by resulting energy price changes, requiring assistance and compensation accordingly. The Commonwealth has indicated that it will be establishing a fund to address these concerns. However the nature and level of States' future involvement in the provision of 'transitional measures, programs and infrastructure' is unclear, given the different capacities of States to mitigate, and also to provide further adaptation assistance to local communities.

This raises the more complicated issue of burden sharing between States in two forms, relating to the level of emissions reduction that should be expected from each State (or whether this should simply be determined by market forces under the CPRS), and to the levels of assistance and compensation that should be directed to and through individual States to meet the social costs of adjustment (above those costs that will be met directly through the national Carbon fund).

Over the past two decades, Australian States have developed at different rates, and their contributions to aggregate national emissions (and GNP) has also varied during this time. For instance, a considerable increase in Victoria's contribution to national emissions due to the continued expansion of its coal-fired power sector over the past decade has been 'buffered' or 'masked' by declines in land clearing in Queensland. Under the CPRS, with an emissions market left wholly responsible for adjustment and considerable emphasis placed on the stationary energy sector, it is expected that such issues will not be of direct concern. But as has been seen with the marketisation of water and water trading, there may be unintended consequences. For instance, in a regionally undifferentiated emissions market, energy corporations in some States may acquire permits to cover their needs and 'starve' competitors in other States in ways which may or may not be able to be accommodated in a national energy market without some ongoing national regulation of permit allocation to limit manifestations of unbridled market-driven 'industry restructuring'.

States will help shoulder the burden of non-CPRS emissions cuts. What of the 'uncovered sectors'? What should drive and mediate change there? Should we be looking towards a burden sharing formula – derived from the Triptych approach used in the European Union – to enable smaller or poorer or 'cleaner' States to get a special deal over the next few decades, or should they be required to shoulder equally the emissions reduction burden generated by 'national' development, at disproportionate social cost? It is here that the EU's experience in burden sharing may yet prove of some domestic value, within our federal system.

VI CONCLUSION

This article has argued, based on the work of the IPCC and more recent international and Australian scientific studies, that the Rudd government's

71 This may yet be revealed by Treasury modelling to be released in October 2008.

current long-term emissions reduction target of 60 per cent below 2000 levels by 2050 will contribute to a very high risk of precipitating dangerous climate change and to catastrophic damage to Australia's highly vulnerable environmental, social and economic systems. Maintaining this target will certainly lead Australia to breach its obligations under the *UNFCCC* and other key environmental treaties.

To minimise the risks and also the costs of delay, Australia should adopt targets sufficient to help stabilise global concentrations of GHGs at below 450 ppm. Australia's medium-term (2020) emissions reduction target therefore should be significantly greater than 25 per cent and probably more than 40 per cent below 1990 levels by 2020. Its long-term target should be between 90 and 95 per cent below 1990 levels by 2050.

While recent Australian studies indicate that achieving significant medium term emissions reduction targets are highly feasible economically and socially, nevertheless such targets would place additional pressure on the proposed CPRS, which remains a critical measure for their achievement. Complementary measures used in both 'covered' and 'uncovered' sectors would become even more important policy tools under these circumstances. State-based emissions reduction programs and measures remain important contributors to the successful achievement of national targets in Australia's federal system. Therefore emphasis should be placed on clarifying the means by which States' contributions can be coordinated and harmonised to achieve strong national emissions outcomes.