

GLOBAL WARMING AFTER THE OBAMA ACCORD

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The making of policy about climate change requires decisions under uncertainty. It shares this reality with many areas of policy; and with the judges' application of the law to practical decisions that must be made day by day in a modern society.

Humans are not good at making decisions under uncertainty. This was a conclusion of my recent book on the global financial crisis: *The Great Crash of 2008* (Garnaut with Llewellyn-Smith, 2009). We humans systematically underestimate the probability of unlikely events when things seem to be proceeding normally. But with a severe mishap, we panic, and turn to thinking that nothing will ever go right again.

On any important decision, there are many gaps in our knowledge. When we can form views on the basis of experience with similar issues in the past, we are talking about risk. When repeated experience can provide no reliable guide, we are talking about uncertainty. The human mind builds castles in the air to make decisions possible under conditions of uncertainty. The castles disappear like Macbeth's witches as breath into the wind with new knowledge and experience. But we are still called on to make decisions about the uncertain matters. Decisions and life go on.

In my first address on climate change to the National Press Club in 2008, at the release of the Draft Report of the Garnaut Climate Change Review, I observed that it seemed unlikely that humanity could make and implement effectively the long series of improbable decisions required for the risks of dangerous climate change to be reduced to acceptable levels. One response is to give up. But given what is at stake, this would be a foolish response, because we really do not know what will turn out to be feasible.

I referred to an episode in Australian history, played out in Hobart in 1999. Gilchrist in only his second test came in to join Langer with Australia 5 for 126 chasing 369 in the fourth innings of a test match against Pakistan. To the general run of humans—Australian, Pakistani or Brit—it seemed impossible. Nothing like that had been achieved in a century and a quarter of test cricket. After the game was over, a commentator asked Langer what he had said to his neophyte partner as the latter met him at the wicket. Said Langer, “You never know what will happen.” So Langer and Gilchrist put their heads down to bat through the next over. Then the next hour. Then the whole session till stumps. At some time during the next morning session, more of the impossible task lay behind them than ahead. The possibility that they might make it entered their heads.

The rest is history.

Langer says that these same dynamics were at work again this summer, in Sydney two weeks ago. Australia and Pakistan again. Yes, again, we now know that it wasn't impossible.

These are triumphs of the human mind against the odds. The Great Crash of 2008, on the other hand, is the triumph of apparently low odds over human frailty.

And so the general run of humanity is drawing exaggerated conclusions from the fiasco at the United Nations meeting in Copenhagen. In human affairs, flawed assessments of

the probabilities can create surprises—human triumphs over the apparent odds, as in Hobart and Sydney; and human capitulation in circumstances in which disastrous outcomes might have been avoided with normal common sense, as in the Great Crash and its tragic legacy in the old industrial countries. Yes, the Copenhagen conference itself was a fiasco, although the discussions leading up to it were not. No, it does not mean that effective global mitigation, with all major countries making substantial contributions, is now impossible.

I will return to Copenhagen. But first, a bit more about decisions under uncertainty.

I drew on the language of the law of tort and contract in my discussion of policy-making under uncertainty in the Climate Change Review. A judge in a civil case must make a decision on a balance of probabilities. Rarely in a case that comes before one of Australia's superior courts is the defence so weak that it can find no so-called expert to blow a fog through the proceedings. The judge's job is to avoid wrong steps through the fog; to assess the chances that one so-called expert is more likely to be right than the established opinion.

That is what I had to do at the start of the Climate Change Review. There was and is a similarity of view amongst almost all of the world's mainstream climate scientists. To the prejudiced mind, that might suggest conspiracy. To the experienced judge of the evidence, it establishes a presumption of truth to be tested. No, the science is not settled on all of the dimensions of a complex natural system that are important to human society—science is never settled in an absolute sense, and in a complex system the detail will be adjusted continuously as more data become available. But there is a well established theory of warming induced by increased concentrations of greenhouse gases, received by all who have studied the climate science professionally. There is considerable uncertainty about the precise way that the growth in greenhouse gas concentrations will interact with other features of the climate system, to determine the magnitude of warming and its impacts on phenomena of importance to human society. There is a clear view from the true climate sciences about the presence of large dangers from unmitigated growth in concentrations of greenhouse gases. This view of the specialists in climate science is supported by the learned academies of science in all of the countries of great scientific achievement.

The consequences of unmitigated growth of greenhouse gas emissions might be better, or might be worse, than is suggested by the average of reputed expert opinion. One of the possibilities is that it might be much worse.

I concluded in the Climate Change Review that, on a balance of probabilities, the mainstream science was broadly right about the probability distribution of possible outcomes. The mainstream science may be wildly wrong, but that is unlikely. It would be imprudent beyond the normal limits of human irrationality to rely on the thin air of dissent rather than the mainstream science.

Nothing that happened at Copenhagen changes the odds about the mainstream science being broadly right. If there were high risks of dangerous climate change in the

absence of effective mitigation in November 2009, there are high risks in January 2010.

There are some in mainstream climate science who have come to the view that although carbon dioxide emissions affect climate, the effects are so small relative to other considerations that they do not warrant active mitigation. It happens that these are few amongst those with real credentials in climate science.

There are rather more people, outside or from the distant edges of the relevant science, who hold strongly to the view that greenhouse gas emissions have no effect on climate at all. These are the true believers, who dominate the contemporary media discussion of these matters—rather more in Australia at present than in other countries. Peter Doherty, Nobel Laureate in medical science, pointed out in the University of Melbourne's Festival of Ideas last July that the true believing dissenters are present on every major issue of science that has large implications for human society. They are present in discussion of the relationship between immunisation and disease. They are present in the discussion of the cause of AIDS, especially in countries in which the incidence of AIDS is particularly high.

In the lead-up to Copenhagen and subsequently, the dissenters have generated excitement with publicity for one after another challenge to mainstream science. To a lay person who has sought to understand what the mainstream science had been saying, with all its qualifications and complexity, each of the points of excitement were familiar from the literature.

Shock! There is natural variability in climate. Well, mainstream science has always said there was a great deal of natural variability. The Garnaut Climate Change Review devotes a lot of pages to explaining its role alongside human-induced changed.

Shock! The natural variability of climate over the past four billion years, and over the past couple of billion years of life on earth, has seen many periods when temperatures were much higher than now or than anticipated in future with unmitigated expansion of human emissions. So it has. But not in the period of modern human civilisation.

Shock! Warming has stopped, because no year since 1998 has been as hot as that El Nino year. Well, this question is amenable to standard statistical analysis. I applied that analysis in the Review. Temperatures since 1998 cannot be explained without reference to a warming trend over the past half century, and there is no statistical evidence of a change in that trend in 1998 or any other year. Mainstream statistical analysis conventionally uses 95% confidence limits—something more like the test applied in the criminal law, beyond reasonable doubt, than the civil law's balance of probabilities.

Shock! Water vapour is a more important greenhouse gas than carbon dioxide. So it is, says the mainstream science, and so said the Climate Change Review in seeking to summarise the mainstream science.

So after we have been drowning in our dreams in the deep dark of night and clutching at the straw that the climate change dissenters are right, let us remember in the light of

day that a setback for international cooperation does not change the odds that the science is wrong.

So did the fiasco at Copenhagen change anything?

Maybe, and Yes.

Maybe. I hope that the Copenhagen meeting finally led to the realisation that complex decisions cannot be made through open fora involving and requiring unanimous support from all of the world's sovereign nations. I hope that the long speeches from Sudan purportedly representing the G77 were the final eulogy and epitaph for the established processes of the United Nations Framework Convention on Climate Change (UNFCCC). I hope that the international community learned at last that the important decisions will need to be made wisely by a group of major countries, drawing on detailed numerical work by experts representing heads of Government. I hope that consideration will be given to what will encourage wider participation in an international agreement, but that there will be no naive hopes of consensus amongst all members of the United Nations. Otherwise the UNFCCC will be an impenetrable barrier to effective mitigation.

Yes, the inclusion in what I call the Obama Accord of principles and some numbers for transfers from developed to developing countries in support of mitigation and adaptation are important steps towards the emergence of an effective global climate change policy. The world has gone as far as it can usefully go within global fora in defining such transfers. Subsequent discussions amongst a limited number of large developing and developed economies can honour the incipient agreement at Copenhagen, without letting continuing disputation over these matters get in the road of progress on mitigation.

Yes, the inclusion in the Obama Accord of the objective to hold warming to two degrees above pre-industrial levels was a step forward. Or, realistically, the objective to substantially increase the probability of holding warming to two degrees. That more or less equates to bringing concentrations of greenhouse gases in the atmosphere back to and then below 450ppm after a period of overshooting.

Here we should acknowledge another achievement at Copenhagen: the avoidance of endorsement of a target for reduction of developed country emissions by 2050 that would have contradicted the two degrees objective. There was some momentum for developed countries to announce at Copenhagen that they would reduce emissions by 80 percent by 2050. The Garnaut Climate Change Review suggested, and the discussion since the Final Report has confirmed, that there is no chance of widespread acceptance of radical reductions in global emissions on any basis other than equal per capita entitlements at some time in the future—no later than 2050. The combination of 80 percent reduction from developed countries and equal per capita entitlements would indicate concentrations of around 550 ppm. The calculations of the Garnaut Climate Change Review show that if 450ppm concentrations were to be achieved, equal per capita entitlements to emit greenhouse gases in all countries would require developed

countries to reduce entitlements by about 90 percent from current levels.

The new proposals for constraining emissions that many countries developed in the approach to Copenhagen represent a major step forward. These were most far-reaching and surprising in the case of the developing countries. The Garnaut Climate Change Review notionally allocated emissions entitlements amongst countries on the basis of explicit principles that were judged to have some chance of forming the basis for global agreement. Within that framework, the developing countries as a whole made commitments in Copenhagen that represent their full share of what was required to 2020 in an international agreement on the objective of 450ppm. China, Indonesia, Brazil and South Africa offered to do considerably more than their full shares. This balanced under commitment by India and some other developing countries.

China said that it would reduce the emissions intensity of output by 40 to 45 percent by 2020. This goes well beyond what the Review marked down as China's reasonable contribution to a global agreement focussed on 450ppm. Indonesia's undertaking to reduce emissions by 26 (unilaterally) to 41 (with international support) percent below business as usual goes well beyond what the Review thought would be reasonable and necessary within a global agreement on 450 ppm. These countries, and South Africa with its carbon tax in the energy sector, and Brazil with its extraordinary progress on the use of bio-fuels, are all implementing policies designed to make contributions that go well beyond what the Review's analysis required of them within an ambitious international agreement.

There has been some attempt in developed countries to play down these commitments in the developing countries as merely confirming the continuation of existing trends. The analysis for the Climate Change Review demonstrates that they represent substantial and large changes in policy and trend. .

Developed countries, on the other hand, offered commitments that were consistent only with their contributions to an agreement on a 550ppm objective. This is principally because of under commitment by the United States. In the current state of United States domestic politics, what was put on the table in Copenhagen is for the time being the best that is possible, despite the better intentions and hopes of a President and administration that are strongly committed to ambitious mitigation. This is a time of great stress in our friend and ally. This is a time for friends and allies of the United States to make it easier and not harder for the President of the United States to succeed at home. We do that by going as far as we can sensibly go in our own mitigation policies. What Australia does is noticed in the United States and affects the domestic debate.

It is said that the Copenhagen meeting failed because it did not lead to binding commitments from all substantial countries. Certainly effective mitigation would have been helped by a binding agreement to which all substantial countries were parties. But such an agreement was never a possibility at Copenhagen. We learned at Copenhagen that the United States may not and the large developing countries are unlikely to enter binding agreements with penalties for breaches for the foreseeable

future. We will have to design international mitigation policies around this reality.

The UNFCCC agreements in Rio de Janeiro, Kyoto and Bali had all excluded the possibility of binding commitments from developing countries. That was a flaw and a mistake. It was a flaw and a mistake that shaped the realities of Copenhagen.

That is why the Garnaut Climate Change Review introduced the idea of one-sided targets for major developing countries. Developing countries would be offered incentives to sign on to firm commitments, but would not face penalties (other than exclusion from the benefits of inclusion) if they did not.

The Review noted that it was important for China to accept binding commitments. This was not because this was fair in all of the circumstances, but for the pragmatic reason that a strong global agreement was unlikely unless China accepted binding commitments. The United States would not make an internationally binding commitment without China. There was some progress at Copenhagen—possibly the only significant movement in positions at the meeting itself. Premier Wen Jiabao undertook to register China's target internationally, albeit with no penalty for non-compliance. The rest of the world may have to live with the large developing country emitters making firm commitments under their domestic law, and taking various steps on transparency and verification, but not entering binding international commitments with substantive consequences for breaches. That is likely to have long-term consequences for American commitments.

There are three problems for effective global mitigation in the absence for the foreseeable future of binding agreements on emissions reductions from the major developing countries and possibly from the United States. One is that others will doubt that the United States and developing countries will deliver on their domestic commitments, and so will hold back on their own. The second is that there is a less secure basis for trade in emissions entitlements, and any diminution in trade has the potential substantially to increase the cost of mitigation for each country and for the world as a whole. The third is that trade in entitlements generates similar emissions prices in each country, and a level playing field for trade in emissions-intensive products—conditions that are more difficult to establish if trade in entitlements is highly constrained. In the meantime, there is a serious risk that what was placed on the table at Copenhagen will be withdrawn, if major players lose faith in each others' will to follow through with their commitments.

How do we set our own targets for emissions reductions in this complex and shifting environment? In the wake of Copenhagen, before we have seen all of the final commitments, we must plan for two possible states of play. In one, the major countries confirm or strengthen what was offered at Copenhagen, albeit in non-binding form or without penalties for breaches in some important cases. In the other, the world does not manage to pull together in a firm form the commitments that seemed to be available in December, and the elements of agreement fall apart.

Games theory has some suggestions for the management of the first state of play. In

the absence of communication and cooperation, international climate change mitigation has the features of a prisoners' dilemma, leading to an outcome that is highly unfavourable for all parties (the absence of strong mitigation). The dilemma could, in principle, be resolved by a comprehensive agreement, that leaves each party better off than it would be if each took decisions in isolation. In the absence of explicit agreement, the best course is for each country to presume goodwill in others—action consistent with the international and ultimately its national interest—and take initial steps in line with that presumption. The likelihood of a good global outcome is then enhanced if each country taking this approach announces that its cooperative response will be withdrawn if others do not do as they have announced that they will do.

Games theory suggests that Australia should take the leaders of China, the United States and other major developing countries at their word, and initially set its targets accordingly. It should monitor the performance of others, and adjust its own commitments in the light of any failure of delivery, or excess of achievement.

If this were Australia's approach, what initial targets for emissions reductions by 2020 would we announce within the first state of play? We will not know all the numbers until they have been incorporated in the documentation of the agreement out of Copenhagen. This will not happen for some time. However, if the strong versions of the indicative numbers made available in Copenhagen in December were confirmed, the developing country commitments viewed in isolation, corresponding to 450ppm, would warrant an initial target reduction of 25% on 2000 levels by 2020. The developed country commitments, viewed in isolation, corresponding to 550ppm, would warrant an initial reduction target of 10%. Weighing the two by their contributions to global emissions would suggest an initial emissions reductions target of a bit more than 15 percent, perhaps 17 or 18 percent. This would be announced as a conditional target: it would be adjusted periodically, upwards or downwards, in the light of the performance of others. Over-performance by the big emitters is a possibility—perhaps, for example, as a result of political constraints easing in the United States after next year's Congressional elections (as Justin Langer says, you never know), or as a result of China finding that it is easier politically and less costly to reduce the emissions intensity of production than it had thought.

The issue of verification will remain important. It is hard to see any system of mitigation being effective without each substantial country agreeing to international verification of its emissions. This will be a major focus of international discussion in the period ahead.

All of the influential large studies of the costs of mitigation have assumed the opportunity to trade emissions entitlements, so that abatement occurs in the locations in which it can be secured at lowest cost. Efficient trade in emissions entitlements requires firm national targets, and the verification of actual emissions in the countries participating in trade. The Copenhagen arrangements do not meet these tests; nor has a base yet been laid for something better to emerge in Mexico next December. As a consequence, the costs of Australia meeting any particular target may be substantially above the levels presented in the Garnaut Climate Change Review.

There would be merit in Australia considering the development of an alternative model for trade in entitlements that does not depend on universal acceptance of binding commitments. Australia and other countries in the Western Pacific region could come together to establish a regional emissions trading scheme. It happens that the leadership of Australia's immediate neighbours, Indonesia and Papua New Guinea, are committed to strong mitigation. All member countries could accept an emissions reduction trajectory consistent with the achievement of 450ppm global concentrations. All would accept international verification of emissions, which would require technical assistance from developed to developing countries. Countries which reduced emissions more rapidly than entitlements would be able to sell the "surplus" to other members of the scheme. "Deficit" countries could buy permits from other members. A net balance for the regional scheme could be traded with the rest of the world. New Zealand, Papua New Guinea and Indonesia would be obvious candidates for membership, all being countries with close established ties with Australia on climate change policy. Membership by Japan, Korea and Southeast Asian countries beyond Indonesia would lift the regional arrangement to high global significance. It could become a model of good practice in establishing targets, measuring and verifying emissions, extending mitigation comprehensively to bio-sequestration, the provision of transfers through technical assistance and other means from developed countries to support mitigation and adaptation in developing countries, and international trade in entitlements based on national targets.

In the meantime, how does Australia meet its targets for emissions reductions? The change of leadership of the Opposition after the agreement with the Government to support the Emissions Trading Scheme (ETS) in the Senate, and then the fiasco in Copenhagen, have made this an even more challenging question. Is the Government's ETS part of the best way forward? Is any avenue to large-scale emissions reductions feasible in the contemporary political circumstances?

It is time to go back to first principles.

Enough work has been done for us to dismiss quickly purely regulatory approaches to the reduction of emissions. For any large reduction in emissions, these will be extremely costly compared with the market-based alternatives that rely on a price on emissions.

Within market-based approaches, two types of policy instruments are especially important, to correct two major market failures. One is the imposition of a price on emissions, to correct the market failure associated with the costs that emissions impose on others. The second is public financial support for research, development and commercialisation of new, emissions-reducing technologies, to correct the market failure associated with the inability of a technological pioneer to capture all of the benefits of expenditure on innovation. Costs of emissions reduction will be lower if both instruments are operating effectively, and if the carbon price is imposed at a similar rate across all economic activities, including positively to activities which remove emissions from the atmosphere.

The carbon price can be imposed as a tax on emissions (commonly called a carbon tax) or through an emissions trading system.

There are several different models of a carbon tax. One is analogous to the ETS, applied to the same sorts of enterprises that would be required to surrender a permit with a unit of emissions under an ETS. The authorities regulating an ETS would make permits available at a fixed price. This is the model that those Australian business people who say that they favour a carbon tax over an ETS mostly have in mind. It is the arrangement in the first year of the Government's ETS, and that proposed for the first two years by the Garnaut Climate Change Review, and that now supported by the Australian Greens. Let us call this version Carbon Tax 1.

A much simpler Carbon Tax 2 would impose a tax on the emissions content of fossil fuel at the point of production or import. Carbon Tax 2 is what most economists, but not Don Argus, formerly Chairman of BHPBilliton, or Leigh Clifford, formerly Chief Executive of Rio Tinto, have in mind when they say that they favour a carbon tax. Carbon Tax 2 in Australia would be passed on in significant degree to foreign importers, and so would raise the costs of emissions-intensive goods in other countries. This would encourage the reduction of emissions outside Australia, and help to level the playing field for industries which rely heavily on fossil fuel inputs. It would be administratively simple. It would raise a prodigious amount of revenue in Australia—fully funding a large programme of support for innovation in low-emissions technology and at the same time breaking the back of the budgetary problem that we face in the aftermath of the Great Crash of 2008. It could be seen as a prior means of reducing private rents in the natural resource industries, before consideration of the case for a general resource rent tax along the lines of Australia's established Petroleum Resource Rent Tax (PRRT). I did not model Carbon Tax 2 in the Review, because it was so far from the then current Australian and international discussions. It remains a long way from those discussions, which means that its introduction into the debate would risk delays in action. If others formed different judgements about the political realities constraining the introduction of Carbon Tax 2, it would be worth close assessment from the perspective of the national and international interest.

Carbon Tax 3 would seek to tax carbon used in domestic consumption but not that used in production for export. It could diminish considerably the distortion of trade in emissions-intensive products. However, it would be administratively difficult, and these difficulties would lead to the introduction of short cuts that qualified its advantages. It would be difficult to reconcile with the approach to the pricing of carbon that is emerging in most developed countries. In forms that are likely to be adopted in practice, it systematically excludes trade-exposed emissions-intensive industries from pressure to reduce emissions. Its virtues in relation to trade distortion can be replicated more simply with an ETS or Carbon Tax 1 through the application of an appropriate formula (section 14.5 of the Garnaut Climate Change Review).

The similarities between Carbon Tax 1 and an ETS are greater than the differences. An ETS that is calibrated to hold emissions to a specified level will generate some price for permission to emit a unit of greenhouse gas. A carbon price set at that emissions

permit price, could be expected to generate the same reduction in emissions as the corresponding ETS. In the usual conditions of imperfect and changing information, and of uncertainty about all of the relevant parameters, an ETS provides certainty about the amount of emissions reduction, with uncertainty about the carbon price. The carbon tax provides uncertainty about the amount of emissions reduction, but certainty about the price.

An economically efficient ETS will have all of the permits sold by auction, without the issue of free permits. An economically efficient carbon tax will have no exemptions. The proceeds from sales of permits can be expected to be identical to receipts from a carbon tax that is calibrated to achieve the same reduction in emissions.

Some supporters of a carbon tax say that certainty about the tax rate reduces uncertainty for business. This is only true so long as you do not consider the possible need to adjust the tax rate from time to time, when the tax fails to deliver the desired amount of emissions reductions. There is also one important circumstance in which instability in the emissions price through an ETS may contribute to greater stability in energy prices—the case in which instability comes from a shock to supply, such as the oil shocks of the 1970s. In this case, an increase in the underlying fossil fuel price will be partially offset by a reduction in the emissions permit price.

It is argued that an ETS is vulnerable to political economy pressures for free permits and exemptions. Certainly the record of emissions trading schemes on this crucial issue is a poor one, in Europe, Australia and now in the early stages of discussion of an ETS in the United States. It may be the case that it is easier to grant favours outside the public view if they are given in the form of free permits. However, we should take some care about comparing a clean tax without exemptions with a distorted ETS. The pressures for special favours within the carbon tax would commence the moment that it was known that the tax had become a Government's favoured instrument.

An ETS and a carbon tax of similar economic and environmental impact will both have potentially distorting effects on the competitiveness of emissions-intensive industries that compete with industries in countries with different approach to emissions reductions. The avoidance of distortion in both cases may require limited, transitional assistance to some domestic producers. If the carbon tax is applied in a similar way, both require the disciplined application of a formula that compensates domestic producers for the fact that other countries do not have similar carbon imposts to one's own. An economically efficient system of compensation would bear no close resemblance to that accompanying the ETS legislation currently before the Australian Parliament.

The Review favoured an ETS over a carbon tax for Australia (but not for all countries) because it provided greater certainty of emissions reduction; because it was compatible with the approaches which were developing in the Australian and international policy discussion; and because it provided a stronger foundation for international trade in emissions entitlements. These remain advantages, although the

second and third are not as strong in early 2010 as in late 2008.

It must be said that the ETS that emerged from the Government's negotiations with the Opposition falls a long way short of the ideal described in the Climate Change Review. The highly political processes for adjustment of targets will generate uncertainty and periodic invitations to rent-seeking business behaviour. Since the withdrawal of Opposition support, the certainty of continued political disputation will cause market participants to apply a higher risk premium to investment in emissions permits and increase price volatility and the risk of periods when the permit price is low to the point of derision. The postponement of application of the ETS to fuel for transportation, the permanent exclusion of agriculture, the excessive and unprincipled payments to emissions-intensive business and the corresponding absence of capacity within the scheme to fund large-scale support for innovation all diminish the advantages of the proposed ETS over a carbon tax. But these imperfections emerged out of a contemporary Australian political economy that would go to work on a carbon tax as soon as it became Government's preferred mitigation instrument.

The various imperfections of the current version of the ETS, with the certainty of continued criticism from the Opposition, do make price volatility in the early years of an ETS a matter of concern. These reinforce the reasons that I put forward in the Review for introducing the ETS with a fixed price, at \$20 rising at an appropriate interest rate, and keeping that structure in place until satisfactory international agreement had emerged. The removal of the possibility of much higher prices in the early years would add to the case for replacing the distorted arrangements for industry support by an economically principled approach. This would have the incidental effect of freeing fiscal resources for support for technological innovation.

Any discussion of how Australia secures the required reductions in emissions must run severe tests of political feasibility. The two forms of the ETS proposed to the Parliament have the advantage that they could be legislated through a joint sitting of the two houses of the Australian Parliament after a double dissolution. That is all in the hands of the Government. The Australian Greens' recent support of an ETS with a fixed price in the early years introduces another politically practical way forward. The Greens are likely to hold the balance of power in the Senate after a half Senate election held with an election for the House of Representatives at the normal time. If that likelihood emerged as reality, the ETS could become law after the new Senate took its place in mid-2011.

There has been criticism of the use of a considerable amount of revenue from sale of permits for compensation to low-income households. I do not count this amongst the weaknesses of the ETS that is currently before the Parliament. It is said that household compensation reduces incentives to work; and that it reduces incentives to economise on consumption of emissions-intensive goods and services. Some ways of providing compensation would warrant the former criticism. The incorporation of compensation in tax reforms that reduce marginal effective tax rates would not. The price incentives to reduce emissions remain even if the income effects of an ETS are removed for low-

income Australians.

We must also think through the implications of the second state of play that could emerge from post-Copenhagen discussions.

We may not end up with a set of domestic commitments from which we can calculate Australia's proportionate effort. We would then be in the world described by the Garnaut Climate Change Review as The Waiting Game.

To quote the Review:

“In the unlikely event of complete failure of agreement at Copenhagen, and in the absence of any subsequent framework agreement (even among developed countries), and therefore in the absence of clear rules and opportunities for international trade in permits, it would make little sense for Australia to impose quantitative emissions limits. Under this “waiting game” scenario, Australia's best option would be to continue with the emissions trading scheme, and with the rising fixed carbon price of the transitional period described in Chapter 14, until international agreement or 2020. Continuing an emissions trading scheme would help to keep hopes alive of international agreement, at reasonable cost, until all opportunities for progress had been exhausted.” (Garnaut 2008, p12).

The preferred Australian responses to the whole range of possibilities after Copenhagen can then be described as follows. Australia would legislate the ETS as soon as possible, realistically through a joint sitting after a double dissolution, or with a government elected in a normal general election obtaining support in a newly constituted Senate after July 1 2011. The fixed price currently proposed by the Government for the first year of operation would be continued at higher rates in the second year and until such time as a firm basis had been established through international agreement for setting Australian targets. Australia would advise the UNFCCC that it would set its target in the range of 5 to 25 percent reduction from 2000 (or, what would not be very different, 1990) levels by 2020. It would announce that it would set its target within this range on the basis of the weighted average of the commitments of other countries, calculated within a rigorous framework designed to allocate mitigation effort amongst countries on an explicit and reasonable basis. If the approach recommended by the Garnaut Climate Change Review were adopted as the rigorous framework, and all countries entered at least firm domestic commitments to the targets revealed in Copenhagen, Australia's proportionate reduction would be about 18 percent. Australia would make the transition from a fixed and rising permit price to a freely floating price when there was a satisfactory basis in international agreement. It would make it clear that it would subsequently change its targets in the light of departures of other countries from declared targets.

So let us all be judicious in coming to firm conclusions on the science on a balance of probabilities. My own immersion in the subject for eighteen months and interest and

reading since then tell me that humans everywhere have an interest in strong global mitigation starting right now, and that Australians who care about the future of civilisation in their country have a stronger and more urgent interest in action than the citizens of any other developed country.

As thoughtful citizens, let us all recognise that it is important soon to introduce a price on carbon; that the contemporary political environment makes that difficult in any form; that an imperfect ETS is better than delay; and be ready to support the Government if it is bold enough to go seek the dissolution of both houses on this issue at an early date. This need not deter us from encouraging the most obvious improvements, which could include a moderate fixed price in the early years, a major change in the form in which transitional assistance is provided to industry; and the use of the accompanying fiscal freedom to provide comprehensive support for innovation in low-emissions technologies.

It is time to apply the wisdom of the Clapham Omnibus or the Bondi Tram, and ask our representatives to get on with the job.

REFERENCES:

Garnaut, R., 2008, *The Garnaut Climate Change Review*, Cambridge University Press, Melbourne, <http://www.garnautreview.org.au/index.htm>.

Garnaut, R. with Llewellyn-Smith, D., 2009, *The Great Crash of 2008*, Melbourne University Publishing, Melbourne.