

Submission to the Senate Economics Committee on the Carbon Pollution Reduction Scheme Exposure Draft Legislation

Dr Peter Wood¹, March 2009

This submission is on the Australian Government's Exposure Draft Legislation for the implementation the Carbon Pollution Reduction Scheme. The most crucial problem, when it comes to mitigating climate change, is the problem of achieving international cooperation to reduce greenhouse gas emissions.

These comments examine the issue of what changes should to be made to the legislation to maximise the likelihood of international cooperation on reducing greenhouse gas emissions. We make use of game theory, the economics of climate change mitigation, the economics of damages from climate change, and some of the recent scientific literature.

We argue that the 15% conditional emissions reduction target undermines international cooperation on emissions reductions, because it is likely to rule out emissions reductions of more than 15% (on 2000 levels) by 2020. Our key recommendation for facilitating global cooperation is to remove paragraphs 2(b) and 3(b) from Section 15 of the Exposure Draft Legislation. Doing so will greatly increase the environmental integrity of the Carbon Pollution Reduction Scheme.

The 15% Conditional Target

The Carbon Pollution Reduction Scheme is likely to rule out net emissions reductions of more than 15% of 2000 levels by 2020 (Part 1, Section 3 (4) of the Exposure Draft Legislation). I will argue that this reduces the likelihood of any international agreement that stabilises greenhouse gas levels at 550 parts per million or less, because it rules out Australia playing its proportionate part in emissions reductions.

It has been suggested in the Treasury modeling that the 15% target is consistent with global stabilisation of greenhouse gases at 510 ppm CO₂-e (carbon dioxide equivalent)², but this is unlikely to be true. This modeling claims that the CPRS -5 and CPRS -15 “multi-stage” scenarios are more realistic than the Garnaut “contraction and convergence” scenarios because the multi-stage scenarios assume that different countries start taking on emissions reductions at different times³. But there is another difference, the CPRS scenarios assume that when a group of countries start making emission reductions, they all do so at the same rate relative to the reference scenario. Because these scenarios do not relate emission reductions to per-capita emissions, this is unlikely to be perceived as equitable by developing countries and low per-capita emitters, and therefore unlikely to be an approach that would be accepted by developing countries.

1 Dr P. J. Wood, The Department of Applied Mathematics, Research School of Physics and Engineering, The Australian National University (Peter.J.Wood@anu.edu.au).

2 A greenhouse gas atmospheric target, when measured in carbon dioxide equivalent, measures the climate impact of all greenhouse gases in equivalent units of carbon dioxide. We will also be discussing carbon dioxide levels (as well as greenhouse gas levels). A carbon dioxide level is a lower bound to the greenhouse gas level.

3 Treasury (2008), p. xi.

The Garnaut scenarios are based on all countries eventually converging to the same per-capita emissions allocations in 2050. After 2050 different countries may have different gross amounts of per-capita emissions, but they are allocated the same number of permits per person. Is a convergence date of 2050 likely to be acceptable as part of an international agreement? In his *Targets and Trajectories* Supplementary Draft Report, Garnaut stated⁴:

A relatively gradual convergence to equal per capita allocations, with the year 2050 proposed by the Review, could be seen in developing countries as developed-country-biased, as it perpetuates for some time the current unequal patterns of use of the atmosphere. What is outlined is probably at the limits of acceptability to developing countries—it demands a modest departure from developing countries' current emissions growth path in the short term, and strong deviations in the medium term.

It is important for Australia to be flexible on issues that relate to equity, including whether an agreement is based on per-capita emissions, and the convergence date for an agreement based on per-capita emissions. This is because it is more likely that a large number of countries will agree to an international environmental agreement if it is perceived to be equitable.⁵ For Australia, a developing country and a high per-capita emitter, to not be flexible on equity issues that favour high per-capita emitters, would undermine the likelihood of a comprehensive international agreement that reduces greenhouse gas emissions.

There is also the possibility that an international agreement is reached that is not consistent with Australia's proposed targets. Australia would then have two choices: It could accept the agreement and change its targets; or it could choose not to accept the agreement and face the consequences of being perceived to be a free-rider. The CPRS White Paper argues for scheme caps and gateways because they provide certainty for investors⁶, but they provide less certainty if there is a risk that Australia will have to change its targets in order for it to participate in an international climate agreement.

Because Australia should be flexible on the issue of contraction and convergence, and the convergence date, it would be useful for international scenarios with an earlier convergence date to be considered. This could include a 2040 convergence date and a 2030 convergence date. Ball-park estimates⁷ suggest that a convergence date 10 years earlier (i.e. 2040 instead of 2050 or 2030 instead of 2040) would require Australia to have its 2020 emission allocation reduced by 8-16%.

Scheme Caps and Gateways

We now turn our attention to the issue of scheme caps (Part 2, Section 14 of the Exposure Draft Legislation) and gateways (Part 2, Section 15 of the Exposure Draft Legislation). The legislation states that the regulations must set a scheme cap for five years *or more* into the future; and may set a scheme gateway, with upper bounds and lower bounds for the scheme cap for the financial year beginning on July 2015, and *any* later financial year. This is slightly different to what is stated in the White Paper, which is that “the Government intends to provide up to 10 years of gateways

4 Garnaut (September 2008), p. 14.

5 See Barrett (2003), pp. 299-301, for a game theoretic discussion on why fairness would be perceived to be important by participants in a cooperative outcome.

6 Department of Climate Change (December 2008), Chapter 10.

7 Wood (September 2008), p. 8.

beyond the minimum five years of certain Scheme caps, taking into account progress in international negotiations” (Policy decision 10.3).

There are two issues here. Firstly, are the caps and gateways that are in the government policy (the White Paper) appropriate? Secondly, is the framework for caps and gateways (the Exposure Draft Legislation) appropriate? Let us focus on the second issue.

Suppose for a moment that there was a comprehensive international agreement that not only reduced greenhouse gas emissions, but also reduced emissions in an optimal way. Reducing emissions in an optimal way would take into account the climate science, as well as the costs of mitigation and damages from climate change. The economics of climate change suggests that we should do our best to avoid even a low probability of potentially catastrophic outcomes⁸. The science, according to the NASA climate change scientist Dr James Hansen, suggests that if we maintain carbon dioxide concentrations of 450 ppm or more, for sufficiently long, the Earth would be pushed toward an “ice-free state”, and “the passing of climate tipping points and dynamic responses that could be out of humanity's control”. Hansen therefore recommends that “an initial CO₂ target of 350 ppm, to be reassessed as effects on ice sheet mass balance are observed, is suggested”⁹.

What sort of emission reductions are required to stabilise CO₂ levels at 350 ppm or less? For any particular target, there is more than one trajectory to that target, and more than one way of allocating emissions between countries for any particular global trajectory. Most studies that have been done so far have focused on higher stabilisation targets, but there have been some that have included trajectories that stabilise at 350 ppm CO₂. One of the more recent studies has OECD countries reducing their emissions by 5.17% per year¹⁰. No one has modelled in any detail (as far as the author is aware) what the mitigation costs of stabilisation at 350 ppm or less of CO₂ are. However, there have been studies that suggest that the cost of stabilising at 450-500 ppm CO₂-e of greenhouse gases are low.¹¹

If optimal international cooperation on reducing greenhouse gas emissions was achieved, Australia could have reductions in emissions allocations of over 5% per year. This may be expensive, but an approach that is optimal globally is likely to have net benefit for Australia, more so than for most other countries. It would not be in Australia's interest to rule out such a possibility.¹²

It is therefore recommended that given:

- what the science is saying about the climate situation,
- Australia's high per-capita emissions,
- Australia's high historical emissions,
- and Australia's high capacity to reduce emissions or pay for emissions reductions because of its high per-capita GDP,

8 Weitzman (2009).

9 Hansen (2008).

10 Meinshausen (2006), p. 166.

11 McKinsey Global Institute (June 2008)

12 There are huge barriers to this level of international cooperation, but it is not unheard of. The *Montreal Protocol on Substances That Deplete the Ozone Layer* achieved a level of cooperation that was not far from optimal, this is discussed in Barrett (2003), Chapter 8.

it is not appropriate to rule out any level of emissions reductions beyond 2015, and certainly not for an unlimited amount of years into the future. It is appropriate to have an upper bounds on Australia's emissions for years beyond 2015, but not lower bounds. Part 2, Section 15 of the Exposure Draft Legislation should therefore be changed to reflect this issue. This could be easily achieved by removing paragraphs 2(b) and 3(b) from Section 15 of the legislation.

There are also problems with setting weak targets five years in advance: The targets for 2010-2013 are extremely weak, with the 2010-2011 target probably being greater than the amount of emissions. When combined with the 5-15% target range, there will probably be a very low carbon price. The only thing that is likely to prevent the price from collapsing is the banking of permits. It could also be argued that flexibility in emissions reductions could facilitate unforeseen international circumstances, either in the science, or in negotiations. Being able to tighten targets within shorter time-spans could also facilitate voluntary measures to reduce emissions. It is therefore recommended that Section 14 of the legislation is changed so that instead of an exact cap being set for five years, a gateway of upper and lower bounds is set for five years.

It could be argued that measures that reduce the certainty of the scheme cap provide uncertainty for investors. This is true in a limited sense, but there is also severe risk and downside uncertainty on impacts from climate change, there are uncertainties in the damage function. There is uncertainty in international negotiations. There are uncertainties in what carbon price will be required to achieve a certain level of emission reductions. There are uncertainties in the costs of emission reductions. There is uncertainty in whether the targets specified by the Australian government will be sufficient to drive sufficient to drive investment in low emission technologies. Some of these uncertainties could be managed by price based approaches, such as by having a floor on the permit price.

Measures that shift risk and uncertainty from investors to the climate are not appropriate any more, and may not be credible. This is particularly the case when it comes to measures that are not consistent with international cooperation on reducing emissions. This is because a world with poor cooperation on climate change policy is a far more uncertain world than a world where good cooperation is achieved.

References

1. Treasury, (2008), *Australia's Low Pollution Future – The Economics of Climate Change Mitigation*, Department of the Treasury, Canberra.
2. Garnaut, R., (September 2008), *Targets and Trajectories – Supplementary Draft Report*, Commonwealth of Australia.
3. Barrett, S. (2003), *Environment and Statecraft – The Strategy of Environmental Treaty-Making*, Oxford University Press.
4. Department of Climate Change (December 2008), *Carbon Pollution Reduction Scheme – Australia's Low Pollution Future*, Commonwealth of Australia.
5. Wood, P. J. (September 2008), *Submission to the Carbon Pollution Reduction Scheme Green Paper*
<http://www.climatechange.gov.au/greenpaper/consultation/pubs/0507-wood.pdf>
6. Weitzman, M. L. (February 2009), *On Modeling and Interpreting the Economics of Catastrophic Climate Change*, *The Review of Economics and Statistics*, 91(1): pp. 1—19
<http://www.economics.harvard.edu/faculty/weitzman/files/REStatFINAL.pdf>
7. Hansen, J. E. *et al.* (2008), *Target CO₂: Where Should Humanity Aim?* *The Open Atmospheric Science Journal*, 2, pp. 217—231
<http://www.bentham-open.org/pages/content.php?TOASCI/2008/00000002/00000001/217TOASCI.SGM>
8. Meinshausen, M. *et al.* (2006), *Multi-gas Emissions Pathways to Meet Climate Targets*, *Climatic Change*, 75, pp. 151—194
9. McKinsey Global Institute (June 2008), *The carbon productivity challenge: curbing climate change and sustaining economic growth*
http://www.mckinsey.com/mgi/publications/Carbon_Productivity/index.asp