

An Early Action Proposal with Known Costs: A Sensible and Realistic Option for Emissions Trading in Australia *

Warwick J. McKibbin
Australian National University and
The Brookings Institution

* * Paper to be presented at the AIC 2nd Annual Emissions Trading Forum to be held in Sydney 30-31 August 1999. An earlier version of this paper was presented at the ICM conference on Emissions Trading held in Sydney July 12 and 13, 1999. Many of the ideas in this paper draw on joint research with Professor Peter Wilcoxon of the University of Texas at Austin. The author thanks David Pearce from the Centre for International Economics for helpful conversations. The author is grateful for financial support from the Brookings Institution and the U.S. Environmental Protection Agency through Cooperative Agreement CX 826555-01-1. The views expressed in this paper are those of the author and should not be interpreted as reflecting the views of any funding organizations or the organizations with which they are affiliated.

ABSTRACT

In a number of papers, McKibbin and Wilcoxon (1997a,1997b,1999) have proposed to tackle rising greenhouse emissions by using an internationally coordinated system of domestic permit trading schemes with a fixed price rather than a fixed cap on greenhouse emissions. This paper argues that early action by Australia alone is difficult to justify. However, if early action on the Kyoto Protocol is deemed to be warranted then the McKibbin-Wilcoxon Proposal for a permit trading system with a low fixed permit price is a sensible early action policy for Australia, especially if many countries implement it at the same time and particularly if by implementing this proposal as an early action policy, it ultimately replaces the Kyoto Protocol. The paper sets out some important lessons from model research that are crucial for designing an early action policy for Australia. The paper also sets out the original McKibbin-Wilcoxon proposal as a more realistic approach to climate change than the Kyoto Protocol, as well as explaining how this proposal could work as an early action policy.

Professor Warwick J. McKibbin
Division of Economics
Asian Pacific School of Economics & Management
& Research School of Pacific & Asian Studies
Australian National University
ACT 0200
AUSTRALIA
wmckibbin@msgpl.com.au

and
Economic Studies Program
The Brookings Institution
Washington DC 20036
USA

1. Introduction

There are still many uncertainties surrounding the Kyoto Protocol to the United Nations Framework Convention on Climate Change (UNFCCC) which was negotiated in Kyoto in December 1997. The objective of the Kyoto Protocol is to impose binding greenhouse gas (GHG) emission targets for the world's industrial economies and former communist economies of Europe ("Annex I" countries) to be achieved by the period 2008-2012. In previous papers McKibbin and Wilcoxon (1997a, 1997b, 1999) have argued that the Kyoto Protocol is flawed as a sustainable regime for reducing greenhouse gas emissions (see also McKibbin (1998)). Nonetheless, countries appear to be moving forward with plans to implement measures for greenhouse abatement in advance of the "budget period" agreed to in the Protocol (2008 to 2012). This early action is being planned despite the fact that the largest and most important player – the United States - is unlikely to ratify the Kyoto Protocol. Given the great uncertainty about climate change and uncertainty about the likely form of future abatement action, what is a reasonable way for a country such as Australia to move forward?

There are number of problems with mandatory early action¹. One important problem with implementing an early action policy is to explain why a credible announcement of the Kyoto Protocol is not action enough to encourage firms and households to modify their behavior in anticipation of the expected rise in the price of carbon from 2008. An equally valid question is why incur costs early rather than later when postponing action gives more time to adjust?. A number of reasons could be given as to why governments think they need to act before the budget period. It could be a perception of the short sightedness of firms relative to the social good or a realization of the lack of credibility of the Kyoto Protocol which prevents firms from acting optimally relative to how the government thinks they should act, because firms may not expect the Protocol will be ratified. Or it may be that governments need to pre-commit themselves to maintain the credibility of announced future action that otherwise people would not believe would actually be carried out when the time arrives.

It is difficult to make a completely convincing case for substantial early action. However some early action (of the type proposed in this paper) is justifiable in my opinion if it means starting with a sensible early action policy **in all countries** that eventually evolves into an alternative to the Kyoto Protocol.

¹ See Centre for International Economics (1999) for an excellent overview of the key issues.

Whatever the view on the debate about early action, the reality is that many players are moving forward with formulating policies and taking various concrete actions as well as developing markets for carbon trading in various forms, so it is timely to ask what would a sensible early action policy be if you wanted to implement such a policy?

The next section outlines the insights of relevance for the debate on early action that have been learned from a global model used extensively in the climate change debate internationally (the G-Cubed model ²). A crucial lesson from this research for designers of early action in Australia, is that a traditional permit trading system using the Kyoto cap but only within Australia would likely be a bad idea in the lead up to 2008. This would be bad idea because the marginal cost of abatement in Australia is estimated to be well above the marginal abatement costs in key Annex I countries such as the United States. Thus the permit price that an Annex I permit trading system would generate by 2008 would be much lower than the price that would emerge in a permit trading system confined to Australia. Thus a permit trading system using the Kyoto target for Australia but only implemented within Australia would lead to excessive costs in the period from now until 2008. If and when the Kyoto Protocol including an Annex 1 permit trading system becomes operational in 2008, permit prices would fall significantly (as low cost abaters entered the market) and Australia would incur significant costs with little possible benefit in the lead up to 2008.

To avoid this problem, a better idea would be to adopt a domestic form of the McKibbin-Wilcoxon proposal for a permit trading system with a low fixed price and no quantity cap on emissions. This could be implemented for example beginning in 2001 with a low price gradually and credibly rising each year until 2008. The details of the McKibbin-Wilcoxon proposal as designed as a global system is outlined in section 3. Section 4 sets out how this proposal could be implemented in each country as an early action policy and then projects how it could then evolve into a sensible and realistic alternative to the Kyoto Protocol by 2008.

2. Some Lessons for Early Action from the G-Cubed Model

One of the major global economic models used in the international debate (for

² see McKibbin and Wilcoxon (1998) for documentation and the website www.msgpl.com.au

example used by the governments of Australia, New Zealand, Canada and Japan as well as in the Intergovernmental Panel on Climate Change and Energy Modeling Forum model comparisons) is the G-Cubed multi-country³. Results from the G-Cubed multi-country model indicate a number of important lessons that should be kept in mind in designing any regime for climate change policy and in particular for designing an early action policy.

The first lesson is that a permit trading regime of some form will likely considerably reduce the costs of implementing the Kyoto Protocol. In McKibbin et al (1999a) we find that a conventional permit trading system implemented during the budget period reduces the global costs of the Kyoto Protocol by up to 50%. Of this gain, introducing the “hot air”⁴ of the former Soviet Union accounts for 60% of the cost reduction and the pure gains from trading permits accounts for 40% of the reduction in costs.

A second lesson from this research is that abatement costs differ significantly across countries. That is the cost of removing a ton of carbon generated from burning fossil fuels is high in some countries (such as Australia) and low in other countries (such as the United States) This is why permit trading makes a considerable difference to the costs – high cost countries (such as Australia) can gain from buying abatement opportunities from low cost countries (such as the United States). Permit trading allows a very efficient outcome in terms of Annex I emission reductions at minimum cost everywhere.

A third lesson is that an international permit trading system can generate large transfers of wealth between economies which not only has political implications but also has real economic implications in the induced fluctuations in real exchange rates and trade balance which may be destabilizing in the global economy. The size of the transfers associated with an international permit trading system are highly uncertain but could be between \$US20billion and \$US400billion per year by 2010. To put this issue in context, the orders of magnitude of the resource transfer problem is larger than some episodes in recent history which have led to significant problems for the world economy. One example is the US fiscal spending during the early 1980s which through borrowing by the US government (from foreigners and therefore through the balance of payments) lead to a large current account deficit and an appreciation of the US dollar by close to 50% in real terms from 1982 to 1985. Similarly it is bigger that

³ see McKibbin and Wilcoxon (1998) for documentation

⁴ “hot air” are the excess permits that the former Soviet Union would receive based on the fact that 1990 emissions were well above the current and projected emissions due to the economic collapse of this region.

the impact of German Unification in the early 1990s which through borrowing by the German government (i.e. a resource transfer from the rest of the world to Germany) led to an appreciation of the German mark of over 30% in real terms. Whether the outcome of the Kyoto Protocol is destabilizing depends on a large range of factors but very importantly on the initial allocation of permits relative to needs and the price of permits. In the G-Cubed model, the permit price from an Annex I trading system is between \$US50 to \$US100 per ton of carbon by 2010 (depending on the scenario assumptions). This price is very low compared to other models compared by Weyant and Hill (1999) and the various ABARE models (see for example ABARE (1997)). A higher price means much larger transfers between countries. This suggests a fundamental operational flaw with an international permit trading system as envisaged in the Kyoto Protocol.

3. The McKibbin-Wilcoxon Proposal⁵

The McKibbin-Wilcoxon proposal is set out in a number of papers (McKibbin and Wilcoxon (1997a,1997b, 1999)). It is an attempt to design a decentralized but coordinated system that gives participating countries the incentive to participate as well as giving appropriate incentives to households and firms to change the amount of carbon emission where it is cost effective to do so. Importantly, it is designed to eliminate the practical problem of potentially large transfers of wealth between countries set out above.

As originally designed, the McKibbin-Wilcoxon proposal is an internationally coordinated system of national permits and emissions fees for carbon dioxide although it could easily be extended for carbon dioxide forcing equivalence so as to incorporate the 6 greenhouse gases identified in the Kyoto Protocol (carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulphur hexafluoride (SF₆)). Each participating country would agree to levy a stipulated user fee on fossil fuels. In addition, countries would be allowed to grandfather existing emissions using a domestic system of tradable permits. Existing emitters would be given permits and new emitters would be required to buy permits from the market at a fixed price where the price is guaranteed by the government acting as supplier of last resort so as to fix the price.

⁵ This sections draws in large part from McKibbin and Wilcoxon (1998).

The net effect of the policy would be to discourage increases in emissions, and to encourage reductions where they are cost-effective, but without levying a sudden multi-billion dollar burden on fuel users. The key to our system is that, rather than allow permit trading to set the market price as in the Kyoto Protocol, the price of permits within the domestically managed permit scheme that would be fixed by international agreement. The market trading would then determine where abatement occurs, but at a fixed known cost (i.e. the permit price). We propose a fixed permit price of US\$10 a ton of carbon, because this is well below the price that most models estimate a stabilizing permit price would be. With a low fixed price there would be an excess demand for permits. Once a firm receives an initial allocation of permits from its government, the firm will have to decide whether to buy additional permits, sell some of its allocation, or stay with exactly the number it was given. If it does not buy or sell permits, it can continue with its existing practices at no additional cost (although there is a significant opportunity cost from not selling permits). If it needs to increase its carbon-emitting activities, however, it will have to buy additional permits at a price of US\$10 a ton, giving it a clear incentive to avoid increases in emissions. At the same time, if the firm could reduce its emissions, the permit system would give it a strong incentive to do so: avoided emissions could be sold on the permit market at a price of \$10 a ton. Indeed, many firms have claimed they are willing to undertake low-cost carbon abatement. The permit system we propose will reward firms for these endeavors. The more effort a firm puts into reducing carbon emitting activities at low cost, the higher its profits will be. Any additional permits that are required would yield additional revenue to the domestic government. This would be a significant, realistic step toward controlling climate change.

A key feature of the policy is that it is flexible. The user fee could be adjusted by international negotiation at a regular interval or as needed when better information becomes available on the seriousness of climate change and the cost of reducing emissions. Equally important, it would be easy to add countries to the system over time: those interested in joining would only have to adopt the policy domestically and no international negotiations would be required. This flexibility is crucial because it is clear from current negotiations that only a small subset of countries would agree to be initial participants in a climate change treaty. Also countries can defect from the scheme without debasing the value of the permits for those countries staying in. Thus the system is sustainable.

Since the policy does not focus on achieving a specified target at any cost (indeed the

cost is known with certainty), such a system would be far more likely to be ratified, and by more countries. The political attractiveness of our proposal lays in the fact that it is a decentralized coordinated system implemented by individual countries, rather than a centralized system which can ultimately only be sustained with some form of 'yet to be specified' enforcement mechanism.

This proposal is not simply a uniform carbon tax as it is often portrayed. Only marginal emissions above the target are subject to a direct charge (the price of permits) but most of this is a transfer within industry rather than between industry and government. Indeed existing emitters are implicitly given subsidies to change their behavior because of the opportunity cost of continuing with their activities is the permit price. If firms do nothing they are not subject to any direct cost increase but are awarded profit in proportion to their success at reducing emissions. Although at first sight it appears that existing and new industry are treated differently, in fact this is not the case. Existing emitters receive lump sum compensation for the change in the value of existing capital stock that the permit system would cause. This compensation is proportional to how much abatement they achieve. A unit of carbon emitted will cost both new and existing firms the same because new firms must buy the permit but existing firms must decide whether to keep the permit and give up the permit price or reduce emissions. Either way the permit price will affect the costs of both types of firms in exactly the same way. The initial allocation is purely a compensation mechanism for capital losses embedded in old technology as well as a way to get political support for action on climate policy.

The McKibbin-Wilcoxon proposal has a number of advantages:

- The same price will be charged for each new permit in each country as well as for permits that are traded in domestic permit markets. Thus, the marginal cost of reducing carbon emissions will be equalized within and across all countries that participate. This makes the system efficient because the cheapest emissions reductions will be undertaken first. Environmentalists and engineers often argue that many low-cost options are available for reducing energy demand. If so, these low-cost options will be exploited under this policy, and without needing to be specifically identified in advance by the government. On the household side, for example, the increase in energy prices will encourage households to demand more energy-efficient vehicles and appliances.

- The policy contains built-in mechanisms to encourage enforcement. Governments will have an incentive to monitor the system because they will be able to collect revenue from selling additional permits. Firms will have an incentive to monitor each other because any cheating by one firm would put its competitors at a disadvantage and would also affect the value of permits held by other firms.
- The system is flexible and decentralized. New countries can join by setting up their own permit system and agreeing to charge the stipulated world price for additional permits..
- No country or player has market power that can affect the price because governments control the price.
- Transfers associated with the permit system are largely between firms or between firms and households, rather than between the private sector and the government. It also minimizes transfers across borders, avoiding potentially serious economic and political problems. Unlike the experience of the 1970s, increases in energy prices under this policy would not lead to massive transfers of wealth between countries.
- The policy also could be revised easily as more information becomes available. After setting up the system and agreeing on the price of permits, participating countries could meet every five years to evaluate the extent to which carbon emissions have been abated as well as to re-evaluate the extent of climate change and its consequences. If it becomes clear that more action is required, the permit price could be raised. If climate change turns out to be less serious than it appears today, the permit price could be lowered. To minimize the costs of these price changes, future markets could be developed in permits so that risks are effectively shared.

Overall, the advantage of the McKibbin-Wilcoxon proposal for a domestically managed, but internationally coordinated, permit and fee system over the targets and timetables approach of the Kyoto Protocol is simply that our system is far more practical. It is more likely to be ratified by key countries because it limits the cost of compliance and does not require governments to commit themselves to achieving a given target at any cost. It is more likely to be acceptable to developing countries because it is not a Western controlled

centralized system but it does offer countries a reason for imposing a domestically unpopular policy⁶. It is transparent to households and firms globally because it spells out exactly how the policy will work, rather than specifying the target and leaving the policy undefined. It is more credible than a targets and timetables policy because it is not so draconian that countries will be tempted to renege under extreme future scenarios, and because the revenue from selling additional permits will give governments an incentive to enforce the agreement over time. There is also likely to be less opposition from existing industry because compensation is built into the system. Moreover, because it contains a built-in mechanism for limiting economic costs, the risk of setting ambitious emissions targets—which could significantly reduce economic growth if abatement proves to be expensive—is eliminated. This would remove the single most important obstacle to reaching a realistic international climate policy.

Most importantly our system explicitly deals with the uncertain nature of the climate change problem and allows plenty of flexibility when new information emerges on the costs of abatement, changes in climate and new developments in climate science.

4. The McKibbin-Wilcoxon Proposal as an Early Action Policy

In section 3, the essence of the McKibbin-Wilcoxon proposal is discussed in great detail. How would this work as an early action policy and particularly for a country such as Australia?. Firstly it would be implemented as a permit trading system with a fixed price below that which would be estimated to hit the Kyoto Protocol targets. In principle the optimal price could be calculated from the various economic models, however in practice the optimal price varies significantly across models (reflecting the true uncertainty that we face rather than problems with any one model). Thus it would be better to start with a low arbitrary price of say \$US3 per ton in 2001. This could then be raised every year by \$1 per ton until reaching \$10 per ton in 2008.

The Australian government would give out permits to emit carbon annually based on activities in place up to a year which matched the 108% of 1990 emissions as given by the

⁶ such as is often the case with using the International Monetary Fund for implementing sensible macroeconomic

Protocol. This would likely be for activities in place around 1995 (but would need independent assessment by the AGO). All permits required for activities would either be purchased in the domestic market for \$US3 per ton or if insufficient is available, the government would provide as many permits as required for \$US3 per ton. For exactly the reasons outlined in Section 3, this would raise the price of carbon for all participants whether they decided to sell permits or not because even by doing nothing, firms face the opportunity cost of \$US3 per ton which they could earn by abating and selling permits.

If only Australia followed this policy then it would be likely that in 2008 the price of permits under the Kyoto Protocol would be well above \$10 per ton and so prices would rise in 2008 in transition from this scheme to a Kyoto trading scheme. The existence of a futures market would be essential to help manage the transition into the Kyoto Protocol. A better outcome would be if all countries decided to keep the early action policy as a replacement for the Kyoto Protocol.

If all countries adopted this early action policy then by 2008 all countries would have permit trading systems domestically with the same price. There would be no need to switch to the Kyoto system especially if it turned out that significant abatement was already achieved at a low price under our system. If less abatement was achieved than desired given the information available in 2008, all that needs to be done is the permit price should be raised in all countries to a new agreed level. Despite the results from many models, there is likely to be significant abatement already achieved through the incentive provided by the price signals and the clear credibility established that countries were going to continue to price carbon well above the existing price.

Thus in my opinion, the strongest case for early action is to establish a more sensible and lower cost regime than that delivered from the highly political negotiations in Kyoto. Not only would the world evolve a more flexible regime that would be better able to cope with the new information we are likely to possess in 2008, but it is a regime that can more easily accommodate developing countries. For a country such as Australia it is hard to see why you would adopt any alternative early action policy (apart from doing nothing except announce Kyoto) because the costs of abatement in Australia is estimated to be well above the price for permits that would eventuate in the world of a binding Kyoto Protocol with all Annex 1

policies that would otherwise be impossible if only domestic political considerations were taken into account.

countries participating.

5. Conclusion

It is debatable whether there is a case to be made for early action in Australia if no other countries are taking early actions. If for whatever reason a binding policy of early action is to be implemented in Australia, this paper argues that the McKibbin-Wilcoxon system of a low fixed price permit trading system is the best alternative. If such a system can be implemented in a coordinated fashion across all countries then a stronger case can be made for early action.

The impacts of implementing a conventional permit trading system in Australia with a flexible price as an early action policy could be very costly if research into the costs of greenhouse gas abatement policies is any guide. Australia is estimated to be a high cost abater and because of this, has most to gain in studies of permit trading within Annex I countries. Australia would therefore have most to lose from implementing a domestic permit trading with the Kyoto targets before the budget period. A sensible alternative, as outlined in this paper, with a low known cost is available. Yet this alternative was also available during the negotiations in Kyoto in 1997 and the politics of negotiation won out over adopting a realistic and low cost sustainable alternative. There is still a chance for this proposal to replace the Kyoto Protocol if it is implemented by major countries as an early action policy. In the debate on early actions in Australia, in which significant costs may be incurred under some policy choices, international negotiations will not be an excuse for a potentially costly mistake.

References

- ABARE (1997) “The Economic Impact of International Climate Change Policy” Research Report 97.4 AGPS, Canberra.
- Centre for International Economics (1999) “Early Greenhouse Action” report prepared for the Australian Greenhouse Office, downloaded from <http://www.greenhouse.gov.au/emissionstrading/cie.pdf>.
- McKibbin W. (1998) “Global Emissions Trading: A Post-Kyoto Proposal” *Agenda* vol 5, no 3, p299-310. (ISSN 1322-1833)
- McKibbin W. , Ross, M., Shackleton R. and P. Wilcoxon (1999a) “Emissions Trading, Capital Flows and the Kyoto Protocol” Forthcoming in *The Energy Journal*, also available as Brookings Discussion Paper in International Economics #144, The Brookings Institution, Washington DC
- McKibbin W. , Shackleton R. and P. Wilcoxon (1999b) “What to Expect from an International System of Tradeable Permits for Carbon Emissions” paper prepared for the NBER workshop on International Permit Trading held in Cambridge MA , June 1998, Brookings Discussion Paper in International Economics #143, The Brookings Institution, Washington DC.
- McKibbin W. , Shackleton R. and P. Wilcoxon (1998) “The Potential Effects of International Carbon Emissions Permit Trading Under the Kyoto Protocol” in *Economic Modelling of Climate Change*, OECD Workshop Report, OECD Paris. Pp49-80. (conference proceedings)
- McKibbin W. and P. Wilcoxon (1997a) “Salvaging the Kyoto Climate Change Negotiations” *Brookings Policy Brief* no 27, November, The Brookings Institution, Washington D.C.
- McKibbin W. and P. Wilcoxon (1997b) “A Better Way to Slow Global Climate Change” *Brookings Policy Brief* no 17, June, The Brookings Institution, Washington D.C. .
- McKibbin, W. and P. Wilcoxon (1999), “The Theoretical and Empirical Structure of the G-Cubed *Economic Modelling* , 16, 1, pp 123-148. Also available as Brookings Discussion Paper in International Economics #118, The Brookings Institution, Washington DC.
- McKibbin W., and P. Wilcoxon (1999) “Permit Trading Under the Kyoto Protocol and Beyond”. Paper prepared for the United Nations University Conference on “The Sustainable Future of the Global System” held on 23-24 February in Tokyo and presented at the EMF/IEA/IEW workshop held 16–18 June 1999 at the International Energy Agency, Paris.

Weyant J. and J. Hill (1999) "Introduction and Overview (to the Special Issue)" *Energy Journal* (forthcoming).